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THE REMOVAL OF METALLIC FOREIGN BODIES FROM THE EYEBALL AND FROM THE ORBIT

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The satisfactory disposal of cases of metallic foreign bodies in the globe and/or in the orbit presents two definite problems. The first of these is the diagnosis of the presence of a foreign body, a determination of its probable structure or alloy mixture and its accurate localization; the second, the surgical procedure to be used which is best for the removal of the foreign body under consideration. In considering extraocular foreign bodies, x-ray plates are the ophthalmologist's single greatest diagnostic aid. Magnetic probes will be used more and more in the near future, but only under circumstances of great stress and with time and equipment limitations. A third might be of importance at rare times, though this will not always be under one's control, i. e. when is it wiser not to attempt the removal of a certain foreign body under treatment? The first two of these three are my immediate direct concern.

A rather logical controversy exists between ophthalmologists and roentgenologists as to the relative value of stereoscopic x-ray films and of films taken in a single plane—horizontal or vertical as the demand may be—but all exposures at a different angle. Some roentgenologists are quite frank in stating that stereoscopic plates are inferior in their diagnostic value while others consider the reverse of this fact. Actually, both means are important, though not always comparably so in a single case. Furthermore, the ophthalmologist is more capable of deciding which of the two is to be used in any given case under consideration.

Figure 1 presents the side view in a case wherein lateral views taken at right angles to each other in horizontal and in vertical planes were of greatest value. The task of deciding which of these foreign bodies lie inside and which outside the orbit and which inside of the globe is almost similar in extent of computations necessary to that needed in studying an astronomical photographic plate. The flat films taken at the varying angles in the two planes, however, showed rotation movements of the foreign bodies in relationship to each other and to the various fixed anatomic landmarks. It was thus possible to decide that of the four bodies in the region of the orbit (fig. 2) *A* lay intraorbital immediately behind the rim of the orbit, *B* within the orbit at the medial angle and the roof of the orbit and *C* and *D* in close relationship to each other below the zygoma and within the temporal fossa. The deformation of the various shot (*E* and *F* as compared with *G*, *C* and *D*) show well the lines of fire resulting in the deformity and fragmentation of the first two (fig. 3). This has not occurred in the last three.

Apparently *G* struck the bones of the skull at a very tangential angle, *E* became fragmented against the solid bones of the frontal plate and the *Fs* were deformed because of their almost perpendicular incidence. *A*, *B*, *C* and *D* show but little change in shape because of their entry into the softer tissues of the orbit or the thick temporal muscle which cushioned the blow or force of impact. It is quite evident that in this case stereoscopic films would have been of much less value for orbital localization.

Figure 4 illustrates another case, however, in which anteroposterior stereoscopic views were of the greatest assistance. The foreign body lies, very probably, partly in and partly out of the orbit. Removal might be done through the temporal fossa or from an orbital approach, or a transcranial approach might even be considered (similar to a Naffziger orbital decompression); this would be considered more seriously perhaps in cases in which the foreign body lies more superior and posterior. The patient was a World War I victim; extraction of the foreign body, delayed for years, was made necessary because of increasingly severe head pains. The patient had lost his opposite eye. The remaining eye had considerable traumatic retinal and choroidal disturbance but still had good central visual acuity. The patient was operated on successfully through the external route by a Shugrue bone resection, on the basis of the stereoscopic roentgenograms. A Krönlein resection, necessary otherwise, would have meant more extensive surgery with no better and perhaps even poorer results. The position of the foreign body would have limited the external bone flap, with danger to an eye already damaged by the original injury; also the degree of scar tissue in the orbit would have made that procedure rather more formidable.

A further utilization of angled plates, this time in the vertical position, is necessary for the study of parallax. Figure 7 illustrates such an instance: A mine explosion victim had one remaining foreign body still retained; its position was uncertain. Here *A* shows the position of the foreign body, the marker being in exact contact with the apex of the cornea and 26 mm. from the foreign body; *B* is the same with the patient looking up 45 degrees and *C* with the patient looking down 45 degrees. The diagrammatic sketch (fig. 5) actually superimposes these three films and the movement of the foreign body. In 45 degrees downward rotating 1 moves only to 2, and with the same amount of upward rotation the foreign body moves to 3. Charting these movements in relation to a 24 mm. eye, one can see that while there has been movement of the foreign body it is

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insufficient to indicate that the particle is in the eye or even in the sclera but that it must be extraocular and that the movement demonstrated must be due to muscular action. This conclusion should be sufficient.

In the first of these 3 cases used as illustrations, the first of the horizontal plates was taken in the line of fire

Fig. 1.—Results of a hunting accident.

and the second at a right angle to this. A simple sketch, as shown, will thus permit exact localization. In the second case, the size of the shell fragment and its relationship to the sphenoidal surface of the lateral wall of the orbit made me feel that stereoscopic plates would localize the fragment well and indicate the best route for extraction. In the third case further surgical procedures were avoided in an eye already seriously jeopardized by previous necessary operations. Without further surgery the eye had a very good chance for recovery, and a retained foreign body would lessen that

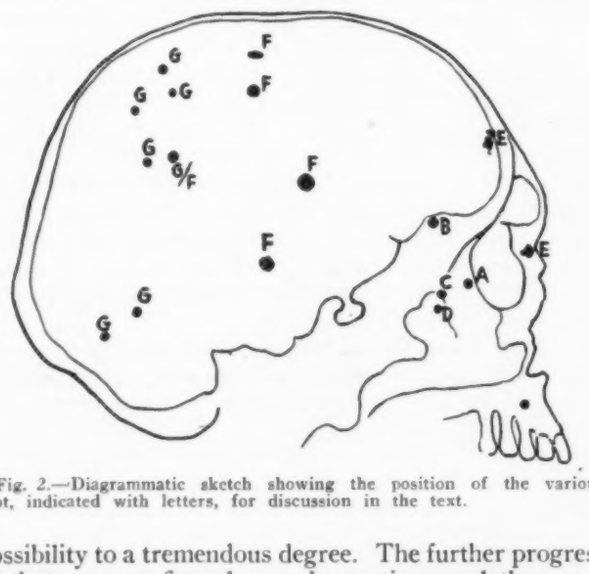

Fig. 2.—Diagrammatic sketch showing the position of the various shot, indicated with letters, for discussion in the text.

possibility to a tremendous degree. The further progress of that case confirmed our observations and the prognosis just expressed.

At this moment, there is nothing to add as to the established value of the triangulation method for the localization of intraocular foreign bodies. As a matter of fact, with the present method of coordinates and of master charts, even that personal equation of excellence of or the lack of this in the roentgenologist taking the pictures is hardly significant. Accurate measurements and positioning and a 24 mm. eye are the only essentials. Many small foreign bodies, especially in the case of multiple foreign bodies, are not always within the globe. They may lie, instead, either on or in the sclera. Other larger foreign bodies may have perforated the globe, traversed the vitreous chamber and again have passed through the sclera to lie external to this. In all eyes in which there is any doubt, air should be injected into Tenon's capsule and then roentgenograms should again be taken and studied. These roentgenograms are to be made at several angles (an exactly similar principle as that mentioned in regard to the first case referred to) to separate the shadow of the foreign body from that of the space of Tenon. The layer of air below Tenon's capsule forms a band of dissimilarity which may be plainly visualized in contrast to the denser bony tissues of the orbit. By making pictures from various angles, the relation of the foreign body particle to the capsule may be accurately demonstrated. The procedure is wholly without danger and

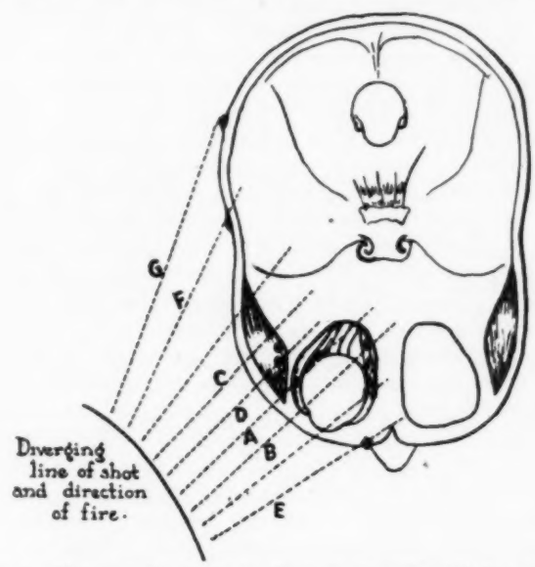

Fig. 3.—Diagrammatic sketch to illustrate the estimated line of fire, the reason for deformity and fragmentation of some of the shot and the localization, as indicated by angled flat views.

its potential value is great. Recently, in a case of nonmagnetic metallic foreign body, probably an aluminum alloy, it was the deciding factor in choosing the surgery necessary.

Radiopaque fixed corneal and scleral landmarks, to be used in localization, are rather common. Many different types have been presented from time to time. Excluding iodized poppyseed oil, all of them are in principle an openwork wire cage which fits over the cornea and on the scleral shoulder. The great difficulty with most is their inaccurate fit, in that scleral and corneal curves vary sufficiently within the normal limits to make errors of 2 and even 3 mm. common. In the surgical removal of nonmagnetic metallic foreign bodies, one must be more accurate than this if satisfactory surgery is to be done. Their greatest value is not to augment localization. This can be done with full satisfaction by the Sweet system, certainly with intraocular particles, and, within certain fair limits, also for extraocular particles. Instead, they furnish fixed external surface landmarks from which exact measurements can be made to permit the removal of non-

magnetic foreign bodies. Iodized poppyseed oil itself can be floated behind a Koeppe contact lens, giving a perfect fixed radiopaque landmark for accurate localization of foreign bodies lying in or at the anterior chamber angle, at the root of the iris and in the ciliary body. It has been the means of deciding the exact position of minute metallic particles.

Figure 6 shows an instance of extraocular foreign body. This is an instance of foreign body cyst with a draining fistula; figure 8 shows the x-ray appearance of the foreign body and figure 9 shows the appearance of the cyst after injections with iodized oil. Figure 10 shows by known measurements the extent of the canthal angles, the cul-de-sacs and the position of the cornea. Removal of the foreign body is facilitated by these various localization methods.

For an intraocular foreign body a small number of true circular silver rings are necessary, one each of about 6 mm., 14 mm., 18 mm. and 20 mm. in diameter, and perhaps intermediate sizes. After localization, the one nearest in size to the position of the foreign body, judged on the globe equatorially, is firmly sutured to the conjunctiva-sclera, and a second smaller one similarly to rim the approximate position of the particle.

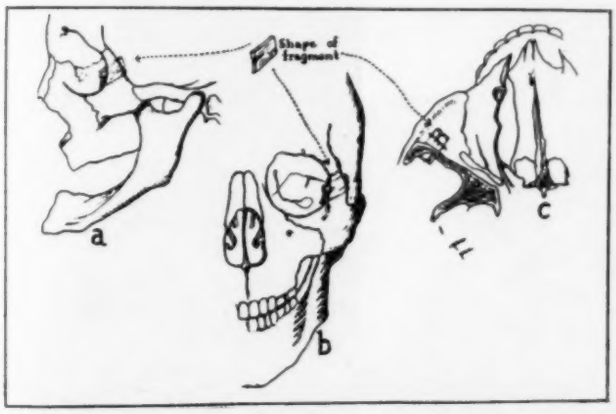

Fig. 4.—Sketches to show the position of a metallic foreign body, as it lay: *a*, from the side; *b*, a front view, and *c*, a (schematic) view from above. Stereoscopic films are of greatest value in this type of case.

These are then checked by exact anteroposterior films. With these rings, of a known size and placed at known distances from the limbus, it is a simple matter to outline, with exactness, a hinged sclerotomy incision for any exploratory incision desired.

A case to illustrate this last technic appears in figure 11. The patient was a ballistics expert and the accident incident to his investigation of a faulty firing mechanism on a revolver. After recovery from the linear extraction, because of a traumatic cataract, one could see the portion of the foreign body buried in the retina and choroid within a mass of exudate wholly inaccessible to the endoscope because of its lack of visibility, and quite unsuited to the use of the biplane fluoroscope. This might have resulted in a fatal tearing off of the retina and choroid. The foreign body was a scale shape portion of a brass cartridge case. After completion of the x-ray studies the rings were sutured in place, as shown in figure 12. Careful measurements were made on the sclera, according to the charts, the smaller of the two rings was marked with gentian violet and the ring removed. The conjunctiva was then incised, the inferior rectus detached temporarily and a hinged flap formed in the sclera, the hinge, however, lying posteriorly. The choroid was detached from the flap of this with an iris spatula and the glistening choroid carefully investigated with a telescopic magnifier. Palpation of the choroid with an iris spatula revealed the foreign body, exactly at the site estimated. This, with the choroid, was grasped with an iris forceps and, following a clean snip by the Barraquer forceps-scissors, the particle was removed with ease. A tiny bead of vitreous presented; so, after the flap was closed

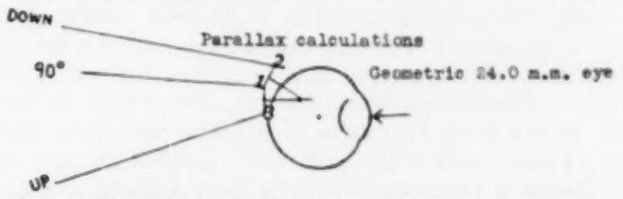

Fig. 5.—Diagrammatic sketch of foreign body shown roentgenographically in figure 7.

with 6-0 plain catgut, the sclerotomy incision was rimmed with Walker needles. The patient recovered with 6/6 aphakia correction and with a full field of vision. This one case, described in some detail, is sufficient to illustrate the general technic. The technic tends to become more difficult and complicated and less useful, the more posteriorward the position of the foreign body.

The biplane fluoroscope has two general applications—the first quite proper and of undoubted value and the second occasionally necessary, even compulsory, but always fraught with danger to the integrity of the eye.

As to the first of these, in the necessary removal of retrobulbar, deeply embedded, radiopaque foreign bodies the technic has no equal; in fact there is no alternative. The operation can be performed with careful dissection and with deliberation to a certain extent, interrupted and the patient moved into the fluoroscopic room and thereafter returned to the operating room for the resuturing of the detached muscles, for the closure of skin and conjunctival incisions and for the dressing. The exact removal of the particle demands accurate localization, a bit of gentleness in the use of grasping forceps and that detailed knowledge of the anatomy of the orbit which all who operate should have. The following case is quite illustrative:

Fig. 6.—Foreign body cyst, with external fistula, cyst and foreign body as shown by subsequent injection of iodized poppyseed oil to lie wholly intraorbital.

A young mechanic was seen with a copper-bronze particle the size and shape of a deformed dime deep in the orbit superiorly and probably entangled in the muscle cone. The patient had almost complete paralysis of the superior rectus, the levator palpebrae superioris and the superior oblique muscle, exophthalmos, and considerable post-traumatic and post-operative inflammatory reaction, for two unsuccessful attempts at removal had already been made. The vision

was still unimpaired. If the earlier unsuccessful operation had not already damaged, beyond hope of recovery, the oculomotor neuromuscular mechanism, early removal was doubly imperative. Extraction with the biplane fluoroscope was uneventfully successful and did not add further anatomic damage to that already present.

The second indication is that in connection with the removal of an intraocular, radiopaque, nonmagnetic foreign body not attached to or in close proximity to the retina, with vitreous clarity disturbed by hemorrhage or exudate. The latter prevents the use of the endoscope, and one dare not attempt the removal of such a foreign body by means of a sclerotomy flap unless the particle can be grasped with exactness through the sclerotomy opening. In such cases one must use a biplane fluoroscope, knowing, however, that grave disorganization of the retina, choroid, vitreous or lens may result. This need not follow necessarily, but it does sufficiently often to make one unwilling to use the procedure for intraocular particles unless absolutely required. The various grasping forceps used for the endoscope are as valuable now as when used otherwise (fig. 13). Forceps that depend on their opening and closure by the conventional two-blade spring connection construction are limited in efficiency. The size of the sclerotomy controls the degree of forceps opening possible, as well as does the ease of the rotation of the instrument within the opening depend on the caliber of the grasping instrument.

One case, sufficiently satisfactory in end result to permit inclusion as an illustration, involved a brass brad removed from the ciliary body or its immediate neighborhood. Convalescence was a bit stormy, resulting in a cyclitic or traumatic cataract and eventually a quiet eye. Enucleation was done years later because of recurrent iridocyclitis, which was reactivated by a minor traumatism. To be fair, however, other men, as Cross, have reported much better results with this form of surgery. Apparently, cases for the technic have not been wisely selected by me. Furthermore, in very recent years a biplane fluoroscope has not been especially accessible.

The literature relative to the use of giant and hand magnets is quite sufficient and needs no repetition. Lancaster's contributions are outstanding. Certain points can be emphasized here properly as being in keeping with this paper. Both giant and hand magnets have indications optimum for use, and one is not interchangeable with the other as an ideal procedure. Exact localization is not always necessary or possible, as the British have shown, in recent war surgery. The giant magnet is not only a therapeutic instrument but also of diagnostic value. Its value is not in an increased magnetic attraction but in its proportionately increased width of magnetic field. Because of this the degree of pull can be even further controlled and definitely affected by varying the distance between the patient and the tip of the magnet. For instance, when the giant magnet is used, and with an anterior route extraction, it is not good technic to use the giant magnet for removing the particle itself from the anterior chamber. The hand magnet is better for the completion of the operation. In the final analysis the giant magnet has its greatest value in the demand for a diffuse magnetic field, which permits and which needs variability, while the hand magnet has its only indication in cases in which the magnet tip can be applied directly or approximated to the foreign body at an interval no greater than 2 mm. This is a clinical proof of Lancaster's criteria for good magnets: "Unless a giant magnet will pull a tiny steel ball with a force over fifty times its weight, at a distance of 20 mm., and unless a hand magnet will pull a tiny steel ball in contact with its tip with a force over five thousand times its weight, they are not good magnets."

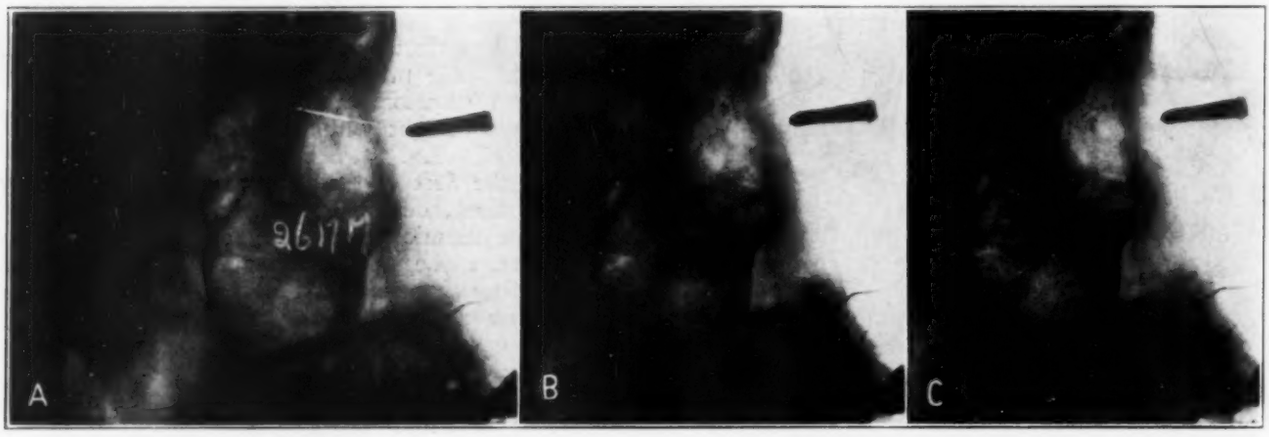

Fig. 7.—Extraocular particle: *A*, marker at 26 mm. distance; *B*, with patient looking up; *C*, with patient looking down.

General rules can be laid down as to the selection of an anterior route extraction versus a transcleral extraction. The smaller the particle the more is the former indicated, the larger the more is the latter indicated. An intact lens should be left so; hence a damaged lens tends to demand an anterior route extraction and permit it for the larger fragments. Foreign bodies that have entered through the posterior segment of the sclera or which lie in the posterior portion of the globe should be extracted from the eye by the anterior route, all other factors permitting. If the point of entrance is well behind the ciliary zone and anterior to the equator, that extraction may be done through the point of entrance. The giant magnet can bring the foreign body toward this point of entrance for easy hand magnet removal. When the particle lies generally in the region of the equator on or in the retina and a posterior route removal is deemed wise, the sclerotomy for the extraction is to be done on the sclera at that spot closest to the position of the particle, and the hand magnet should be used for the extraction. Sclerotomy incisions and points of entrance should be rimmed with diathermy needles to guard against a later

retinal separation. Foreign bodies suspended in the vitreous usually need the giant magnet for extraction. Early surgery is perhaps the greatest factor in these cases unless the foreign body lies wholly within the lens. When only a hand magnet is available accurate localization is absolutely necessary. With the giant magnet this is less important. A permanent magnet has but little value except with foreign bodies in the anterior chamber, and even here their magnetic attraction force is so slight as to be of doubtful value. The anterior route extraction has as its purpose the prevention of further operation damage. Hence, in its use one must prevent incarceration of the foreign body in the iris or the ciliary body and damage to an intact lens. When metallic foreign bodies are removed from the anterior chamber it is important that the corneal incision be perpendicular to the cornea and not obliquely placed at the angle, for the latter will form a shelf, making difficult the removal of a flat or scale shaped particle. After a keratome incision and with magnetic pull, when the iris prolapses because of an incarcerated foreign body, a single meridional forceps-scissors iridotomy will permit the removal of the particle and the replacement of the iris.

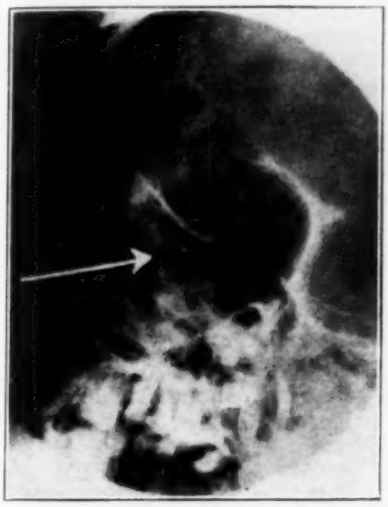

Fig. 8.—Lateral view showing foreign body.

Usually it is useless to work with any type of magnet head except the blunt tip with the broadest magnetic field; similarly, the introduction of forceps, probes, scissors and similar instruments into the eye, these in contact with the magnet core, is of little value as far as magnetic pull is concerned. This also may be the cause for considerable damage to the retina and the choroid. One must remember that the hand magnet is a contact instrument and that the giant magnet alone permits varied manipulations at different angles of attraction for dislodging an incarcerated particle, for guiding a metallic particle around the posterior surface of the lens and for diagnostic purposes. Further, it is wise to remember that all foreign bodies, when magnetically attracted, move with their long axis parallel to the pull of the magnet—never at any great angle from this—and even this deviation from parallelism is only mechanical and due to the friction of structures touching the foreign bodies during the extraction. Extraocular foreign bodies are similar in their individual demands, i. e. the giant magnet versus the hand type.

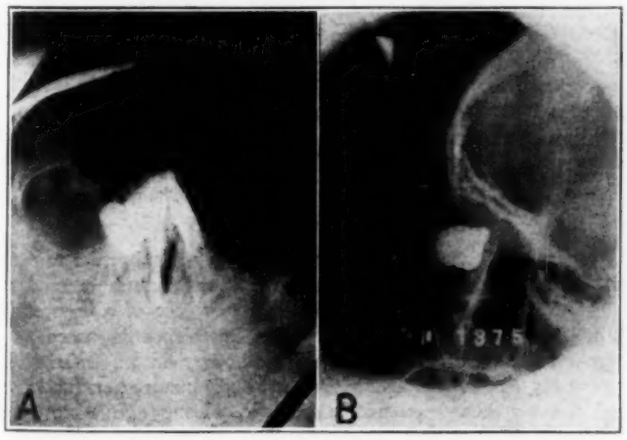

Fig. 9.—*A*, vertical view showing appearance after injection of iodized oil; *B*, lateral view (*A* was printed from the reverse of the films through error).

The ocular endoscope, and especially Thorpe's model, is the last item to be here considered. Its use has been proved an ideal procedure for the removal of intraocular nonmagnetic foreign bodies which lie free within the globe and are not incarcerated or entangled to any great extent in the retina, the choroid or the ciliary body. Furthermore, the vitreous chamber must be reasonably free from free hemorrhage and from gross vitreous opacities. Figure 13 illustrates the endoscope and several of the many varied grasping forceps available—these limited alone by the ingenuity of the surgeon. As a matter of fact, such forceps can and should be designed for individual cases, depending on the particle to be removed. One shown in the illustration is for removing a birdshot, another for a thorn and another for grasping a piece of glass. In some of these cases, the point of entrance of the foreign particle can be used also for the entrance incision of the endoscope. Naturally this depends on the size, the shape and the position of the entrance wound. Localization with the ophthalmoscope is usually adequate, though particles incarcerated in the ciliary body and in the zonula and the suspensory ligament of the lens could hardly be seen with this. If the entrance wound cannot be used, a fresh meridional incision must be made so that the grasping forceps can be approximated close to the foreign body; this incision need not traverse any

Fig. 10.—Front view, with injection of iodized oil, also with corneoscleral marker in place to show the extent of the conjunctival fornices and the position of the cornea. In this view (printed from the reverse) one might think that the cyst lay in part extraorbital; this appearance, however, is due to the fact that the cyst, lying in the soft tissues of the orbit and lid, when filled with iodized oil passes over the internal canthus (see figure 7).

more vitreous than is absolutely necessary. It must be sufficiently large to permit the introduction of the endoscope as well as the removal of the particle held within the grasp of the forceps.

Practice in the use of this instrument is readily obtained by working with various shapes and sizes of foreign bodies placed in a small pill box, covered, about the size of the globe. Holes, to simulate the sclerotomy incision, are made at various positions, in the angles and on the sides and the cover of the box. Visibility within the eye depends on the clarity of the vitreous—so this is an outstanding criterion as to indications for endoscopy. If one cannot see the particle to be removed, the biplane fluoroscope may be the only alternative available.

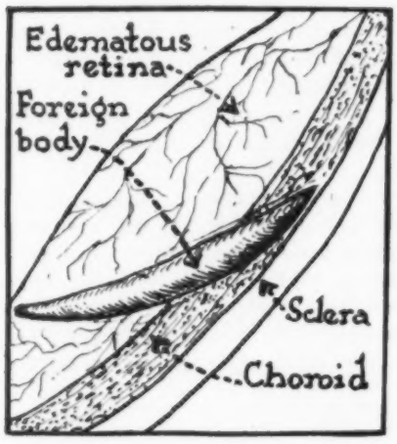

Fig. 11.—Diagrammatic sketch illustrating the position of the foreign body.

Some practical points relative to this instrument, and learned by experience, are worth repeating. The endoscope should be introduced slowly and deliberately, movements and angulations of the grasping forceps and telescope end should be no more than necessary, one should depend on careful preoperative planning to minimize damage to the vitreous, and the forceps should be advanced very slowly and gently to prevent damage to the delicate retina. An assistant must fix the eye adequately and watch at the same time to prevent too deep penetration of the endoscope into the vitreous chamber. Vitreous will not prolapse while the instrument is in use unless the wound of entrance is large or must be made large because of the size of the particle. The structure of the vitreous, bands of infiltration and exudates may make it difficult to grasp a foreign body which is suspended free and not supported by incarceration in some structure. The foreign body is withdrawn with the endoscope, the eye of the operator never wavering from the eyepiece until the instrument is out of the eye. The final grasp, once obtained, on the foreign body should be firm and adequate, even if it is necessary to turn the particle a bit to obtain this. Withdrawing it through the scleral incision in the case of odd shaped particles such as scales, chips or irregular fragments is successful only when it is grasped properly, i. e. the long axis parallel to the pull of the forceps. After withdrawal of the forceps, the sclerotomy incision should be rimmed with diathermy needles, as was mentioned for the transcleral posterior route magnet extraction. The vortex veins must be spared regardless of the position of the foreign body. My experience with the instrument has been limited (perhaps fortunately) though sufficient to agree wholly with Thorpe's claims relative to the value of the instrument.

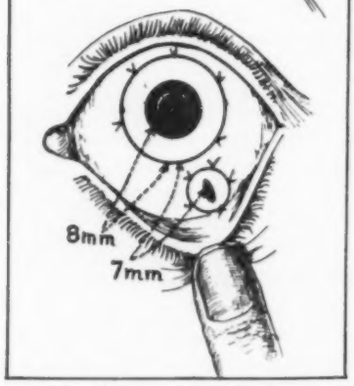

Fig. 12.—The preoperative position of the silver rings. One can see the position for the sclerotomy within the smaller of the two rings.

CONCLUSIONS

The extraction of magnetic and nonmagnetic foreign bodies from the globe and the orbit from personal experiences is considered to evaluate some of the rather significant and important procedures at one's command. They include the following:

1. The great and important possibilities of roentgenograms, frequently not used adequately, both as to flat angled views and as to stereoscopic views.
2. The use of air injections into Tenon's capsule for more accurate localization of extraocular particles.
3. The use of radiopaque appliances for localization, but especially as an aid to the extraction of nonmagnetic foreign bodies, with a flap sclerotomy.

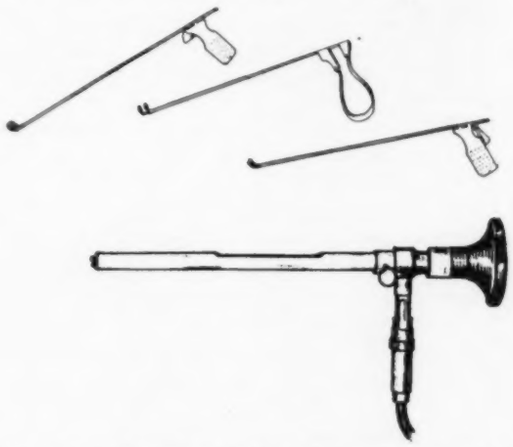

Fig. 13.—The Thorpe ophthalmic endoscope and several forceps to be used with this, one for bird shot, one for a scale or chip, another for a sliver or thorn. (Slightly reduced.)

4. The use of and the indications for the biplane fluoroscope.
5. A consideration of certain important factors in the use of magnets, diagnostic and therapeutic.
6. Indications for, and the use of, the endoscope.

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ABSTRACT OF DISCUSSION

DR. EDWARD STIEREN, Pittsburgh: I do not subscribe to the statement that a foreign body in the vitreous means potentially a lost eye. The vitreous body is more or less of a mystery. Duke-Elder considers it a gel. My experience is based on forty-five years of practicing ophthalmology in an industrial community with a record of more than eight hundred extractions of foreign bodies from within the eye. Long ago I noticed that if the vitreous was much disturbed or a fourth of its bulk was lost it resulted in a sick eye, an eye that was not inflamed or infected but marked by lack of the beautiful transparency of the virteous, so that the fundus would appear as though looked at through a fog. These eyes usually develop minus tension and go into decline, a great many ending in phthisis bulbi. In removing foreign bodies from the vitreous I feel that it is a great mistake to plunge any instrument, such as a cataract knife, in making the scleral section or introducing the various tips that come with the hand magnet into the vitreous and stirring it up. Probably the accident happened about an hour

or two before and the wound of entrance is still open. The temptation is great to apply the magnet immediately. I advise against this for two reasons: The foreign body may not still be in the eye; it may have gone through into the orbit. We must know the size of the foreign body, as well as its location, before attempting removal. The same argument obtains against using the electromagnet as a diagnostic instrument, as a siderоscope. The foreign body may not be within the eye at all. If in the case of a recent injury it cannot be seen with the ophthalmoscope, the eye should be roentgenographed and the foreign body plotted. Then one knows just where the foreign body is, and its size. The sclerotomy is performed with gentle dissecting strokes until the choroid presents, and then a very delicate opening is made through the choroid. Then the tip of the magnet, either the oval or the cone shaped tip, is introduced into the lips of the wound, and only then should the current be turned on. The wound of entrance is misleading sometimes. A foreign body may be long, 4 or 5 mm., and very narrow, and maybe it has left a very small opening in the globe. But in being withdrawn with the magnet it may become lodged crosswise. Instead of tugging and pulling and trying forcibly to remove a large foreign body through an inadequate opening, it is much better surgery and less hard on the eye to have the opening accommodate the size of the foreign body. Dr. Spaeth suggests a hinged flap. I have never tried that. I prefer a T shaped incision.

Dr. Raymond L. Pfeiffer, New York: Dr. Spaeth has reviewed the mechanical and surgical aids which must be available to one seeing many cases of trauma of the eye. A great deal can be said on each of these aids, and one's experience with each does not always correspond with the degree of importance which Dr. Spaeth has indicated. He rightly emphasizes the importance of meticulous x-ray work in the diagnosis and localization of intraocular foreign bodies. Many methods are available for this work, and the roentgenologist is most proficient with the method with which he is best acquainted. I have described a simple, inexpensive and accurate method which gives a meridional plotting easiest for the surgeon to utilize in the operating room. This method employs a contact lens similar to the Zeiss lens, which was adapted to the localization of foreign bodies in the eye by Comberg in 1928. After the lens is placed on the injured eye, posteroanterior and lateral films are made of the orbits, and lines are scratched directly on the films to indicate the meridian in which the body lies, its distance out from the anteroposterior axis of the eyeball in this meridian and its distance back from the limbus of the cornea. The measurements, minus correction factors due to the magnified distortion which occurs in all x-ray films, are transferred to a specially prepared drawing, which shows the eye in front and lateral views enlarged three times for accuracy of plotting. This method is simple, rapid in operation and accurate. It is impossible to make a significant error with it. One need not fear placing the lens on severely injured eyes if a few drops of a local anesthetic such as pontocaine is used. This method is especially well adapted to field work. Nine years of experience in a busy eye hospital with this method has been most convincing. Soft tissue films or bone free films, first advocated by Vogt, should be made in every case of suspected intraocular foreign body. These films are easily prepared and are capable of revealing the most minute foreign bodies of any density greater than that of the tissues. Glass fragments may be revealed with them. They may reveal bodies which can be overlooked in ordinary films. Their usefulness, however, is limited to the anterior segment. In ordinary cases of metallic foreign body they offer a check on the localization achieved by other methods and reveal the shape and suggest the character of the foreign body.

Dr. Harvey E. Thorpe, Pittsburgh: It is important to make a careful slit lamp examination to determine whether there has been a penetration of the cornea, sclera, the iris or the lens. An x-ray examination of the eye is essential. The method of x-ray localization with air injection in Tenon's capsule described by Dr. Spaeth should be valuable. I use Sweet's method of localization and with it frequently combine Comberg's method. I now use a plastic contact lens instead of the glass Comberg lens. Instead of the lead markers, which are difficult to insert into the plastic lenses, I use small platinum wire markers, which can be placed accurately into the plastic contact lens. The contact lens method of localization of intraocular foreign bodies can be combined with a stereoscopic technic. This enables the ophthalmic surgeon to view the eyeball either by the air injection method or, possibly easier, by the method of the contact lens in stereofilm. I cannot stress too strongly the use of the stereofilm and accurate localization, because only then does one know where to make the incision for the removal of the foreign body. The use of the ocular endoscope is a protean procedure. I do not recommend it in the hands of some one who has not previously acquired practice on many animal eyes. It is essential to practice first with the operating end of the endoscope inserted into a little hollow sphere (1 inch in diameter). This should be followed by practice on animal eyes to acquaint oneself with an instrument that is guided only by monocular vision. Being prepared for this major procedure, one may now attempt the removal of nonmagnetic foreign bodies from a nonbloody vitreous. I devised this instrument primarily for the removal of copper, lead or other nonmagnetic foreign bodies from the vitreous. It has been the general experience of ophthalmologists that a piece of copper in an eye meant enucleation of the globe. The use of the endoscope may save the globe and may even preserve sight. One is therefore justified in using the instrument. The endoscope measures 6 mm. across. It is not introduced beyond the scleral incision; it is placed just within and between the lips of the scleral incision. The lips of the wound are held open by previously inserted scleral sutures. The assistant holds the operating end of the instrument to prevent its being shoved too deeply into the globe while the surgeon has his eye at the observing end of the endoscope. With the miniature electric bulb illuminated, only the minute tubular forceps (1.5 mm. in diameter) is pushed down to the lead shot.

Dr. Oscar Wilkinson, Washington, D. C.: I wish to emphasize the importance of attempting to remove very small foreign bodies from the vitreous as soon as possible after the injury. When the foreign body is visible with the ophthalmoscope and one can use a hand magnet and determine, with the ophthalmoscope, whether it is magnetic or not, it facilitates matters very much more to do this early, before any inflammatory changes have taken place. Recently I deferred until the next morning the removal of a foreign body in the vitreous which was subject to magnetic influence, at which time there was no hemorrhage at all in the vitreous. The next morning, when I undertook its removal, the vitreous was full of hemorrhage and I could not find the foreign body without x-ray localization. The use of the hand magnet in removing smaller objects is superior to the larger magnet. With the larger magnet one sometimes gets the foreign body and the eye too. With reference to the scleral route, several years ago I heard Samuels discussing the effects of foreign bodies on the vitreous. His idea at that time was that a foreign body in the vitreous meant that the vitreous would be so altered and so mutilated that eventually the sight would be practically lost. If these minute foreign bodies are removed immediately, the prognosis is more often favorable. One saves a man's eye and gets practically no reaction afterward. I always use fulguration to prevent hemorrhages in making the scleral incision. When a patient comes into one's office with the history of an injury, practically always a penetrating wound will leave a lowered tension of the eyeball. It is a good plan to put one's finger on that eye, and if it is softer it is an indication that that eye has been perforated.

Dr. Elbert S. Sherman, Newark, N. J.: For the successful management of a case of intraocular foreign body proper equipment, experience and good judgment are important. For years there has been discussion as to whether it is safer to remove a piece of steel from the vitreous by the anterior route or through an incision in the sclera. In many cases, for well

known reasons, the anterior route should be chosen. In others, probably a small majority, the transscleral route is safer and easier. It has been alleged that detachment of the retina is a frequent sequel of removal by the posterior route. As I have shown (*Am. J. Ophth.* **22**:1368 [Dec.] 1939) retinal detachment is not a necessary complication. In my experience it has occurred only once. This may be because most of the cases have been seen promptly and operation performed within twenty-four hours after the accident. Another important reason is that no instruments are permitted to enter the vitreous, and this vulnerable structure is disturbed as little as possible. If done early, before the eye has become inflamed or adhesions have formed, the operation is easier and complications are less likely to occur. I have had no experience with the biplane fluoroscope but have been unfavorably impressed by the late results following its use. I agree with everything that Dr. Stieren has said.

DR. STIEREN: In a paper read before the American Ophthalmological Society in 1935 Jonas Friedenwald presented a diagrammatic drawing showing the arrangement of the sheets comprising the vitreous. It illustrates what happens when one introduces anything into the virteous chamber. Friedenwald does not say so, but it seems to me that this viscid material, the fluid between these sheets, if it is not lymph, must act as lymph and is intended for the nourishment of the inside of the eye. When one destroys these sheets one destroys the channels.

DR. EDMUND B. SPAETH, Philadelphia: Dr. Pfeiffer has brought to our attention the importance of the x-rays in the handling of these cases. Relative to Dr. Sherman's statement, there is now a patient in the hospital who emphasizes this matter of retinal detachment. A foreign body perforated the sclera 10 or 12 mm. behind the limbus. The patient on admittance to the hospital had a trifoliate retinal tear and at the end of three days a complete retinal detachment. The patient was treated from the time of his admission to the hospital with absolute quiet and pinhole glass, but in spite of this detachment occurred. With regard to the use of the endoscope, it is absolutely necessary that these cases be taken care of very early; otherwise changes which occur in and of the vitreous make it impossible even to grasp the foreign body with the endoscope forceps, because of the infiltration and condensation of the vitreous encapsulating that foreign body. The paper in its entirety covers certain points most important about magnets. The giant magnet and the hand magnet are not interchangeable, nor is it permissible to consider the anterior and posterior routes as not having maximum optimum indications for use. The giant magnet is a magnet with a wide magnetic field, which can be well controlled and does not demand accurate foreign body localization. The British in their recent war surgery have demonstrated that to us. The hand magnet is a contact magnet and if one cannot approximate the foreign body with a minimum of 2 mm., there is no use whatever in trying even to use the hand magnet. The indications for anterior and posterior route extraction have been covered in the paper.

Irrational Fears.—States of fear are not all "rational" and based on objective realities of the moment. It is one of the calamities of modern life that not a few individuals of adult age are harassed by irrational fears the source of which is to them mysterious and incomprehensible. There is no manifestly threatening situation in the environment, yet they feel afraid. They cannot escape from vague consuming fears that take possession of consciousness, disrupting the harmony of the personality, dissipating nervous energy and destroying peace of mind. It is this subjective fear that is at the foundation of the majority of the so-called anxiety neuroses in ordinary civilian life. Experience has made it clear that many of these subjective fears can be traced to disturbing impressions determinative of emotional imbalance in the early years of life, whilst mind and brain were plastic and the future life pattern was in process of formation.—MacDonald, J. H.: Fear Neuroses, from War and the Doctor, edited by J. M. Mackintosh, M.D., Baltimore, William Wood & Co., 1942.

EFFECT OF GASTRIC RESECTION ON GASTRIC ACIDITY

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Early in the war Willcox [1] reported that, of 41 soldiers evacuated from France and complaining of dyspepsia, 19 had duodenal ulcers and 7 had gastric ulcers. He expressed the belief that the ulcer had existed in most cases prior to enlistment and that conditions in the service had caused a relapse. The etiologic factors for exacerbation or recurrence of symptoms he listed as an increased use of tobacco, alteration of diet, dental deficiencies and familial background. He was unable to relate the high incidence of ulcer to neurogenic factors and felt that ulcer did not develop in men entirely healthy prior to enlistment in the services. Morris [2] later reported that 143 men in a group of 500 soldiers complaining of dyspepsia had duodenal ulcer. Payne and Newman [3] made an interim report on dyspepsia in the British army up to December 1940. From the period of dispatch of the British Expeditionary Force until the invasion of France, 12.5 to 14 per cent of all men evacuated to England had a diagnosis of gastric or duodenal ulcer. This was much higher than the incidence of effort syndrome, which has received much more attention and publicity. Investigation by them disclosed that 92 per cent of the men had had ulcer symptoms before enlistment, which had become exacerbated after enlistment. In 40 per cent of the cases the age was under 25 years.

Saffley [4] more or less summarized the situation in his study among the various military hospitals in England. Three hundred and twenty soldiers who had dyspepsia were studied roentgenographically by him; 111, or 35 per cent, had duodenal ulcers, and only 13 had gastric ulcers. His conclusion was (to paraphrase Napoleon) "In marching on its stomach the army of today apparently produces considerable wear and tear."

Cases of duodenal ulcer are frequently encountered in the medical military services of our own armed forces. The proper disposition of these cases is difficult in the military hospital, which has demands on its beds and its personnel. Most of the patients who have active peptic ulcers ultimately are surveyed from the service. The same fate awaits these men, according to Saffley.

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Read before the Section on Experimental Medicine and Therapeutics at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1942.

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1. Willcox, P. H.: Gastric Disorders in the Services, Brit. M. J. **1**: 1008-1012 (June 22) 1940.
2. Morris, Hugh: Gastric Disorders in the Services, Brit. M. J. **2**: 235-236 (Aug. 17) 1940.
3. Payne, R. T., and Newman, Charles: Interim Report on Dyspepsia in the Army, Brit. M. J. **2**: 819-821 (Dec. 14) 1940.
4. Saffley, Robert: Radiological Investigation of Dyspeptic Soldiers, Brit. J. Radiol. **14**: 96-101 (March) 1941.

in the British army. The problem is one which cannot be discussed here, but we should like to report such a case which came under our observation at the United States Naval Hospital, Philadelphia.

REPORT OF CASES

CASE 1.—A veteran, white, aged 25, was admitted to the Naval Hospital for treatment of an intractable duodenal ulcer. He had been discharged from the Army by reason of medical survey in June 1941 after medical treatment of his duodenal ulcer. He stated that his ulcer symptoms had begun in March 1941, eight months after induction into the Army. In October 1941 he was admitted to the Naval Hospital as a veteran, complaining of moderate but continuous epigastric distress unrelieved by the usual methods. Two courses of modified Sippy type of diet over a period of several months afforded only slight relief. Roentgenologic studies each time revealed the presence of a duodenal ulcer, and analysis of the gastric contents revealed free hydrochloric acid in the stomach ranging up to 65 units. Because of the intractable pain and the failure of medical management to provide relief, as well as the youth of the patient and the moderate elevation of acidity, surgical treatment was undertaken. In February 1942 partial gastric resection of the posterior Polya type was performed for a chronic duodenal ulcer. Between a half and two thirds of the stomach was removed. Subsequent analysis of the gastric contents three weeks after the operation did not reveal any free hydrochloric acid in the stomach even after the injection of histamine. The patient was completely relieved of his symptoms and at the time of dismissal, one month after the operation, was able to eat well.

The operation of gastric resection was chosen not only because it affords the opportunity to remove the ulcer but also because it offers the greatest permanent reduction of gastric acidity. In a previous study one of us [5] showed that when half of the stomach or more, including the pylorus and antrum, is removed a permanent reduction of the free hydrochloric acid in the fasting contents is obtained and that this reduction is to zero in 75 per cent of the cases. If more than this amount is removed there is only a slight increase of the frequency of the reduction to zero. The significance of this relative achlorhydria will be discussed later. One more requirement which we believe is essential is the removal of the pylorus at the time of the resection. While this often contributes to the difficulty of the operation, we believe that it is essential for the ultimate prognosis and especially for the reduction of acidity.

The following case indicates the clinical laboratory results after failure to remove the pylorus in spite of extensive resection of the stomach. While the prognosis as to ultimate cure and certainly as to immediate relief is favorable, it surely does not offer the same chance for complete cure that pyloric removal does.

CASE 2.—A veteran aged 41 was admitted to the United States Naval Hospital, Philadelphia, in May 1940 suffering from acute perforation of a duodenal ulcer. The perforation was repaired and after several months on medical management the patient was dismissed in September 1940. He was advised to remain on a restricted type of dietary regimen. He was readmitted to the hospital in November 1941 with a diagnosis of recurring active duodenal ulcer. Roentgenologic studies at this time revealed an active nonobstructing duodenal ulcer, and analysis of the gastric contents revealed free hydrochloric acid in the fasting contents up to 80 units. For a time relief was obtained by careful medical management, but the symptoms ultimately became intractable and surgical intervention was advised.

In February 1942 resection of the stomach was performed. There was so much inflammation about the duodenal ulcer, which was at the superior margin, that an inflammation mass the size of a fist and including the head of the pancreas was formed. This extensive inflammatory process precluded the safe removal of any of the duodenum or even of the pyloric portion of the stomach. In the hope of avoiding gastroenterostomy, with the very likely occurrence of a marginal ulcer, gastric resection somewhat after the type advocatetd by Finsterer was employed. This included removal of almost four fifths of the stomach, leaving a small portion of the pyloric antrum to ensure a safe closure of the stump. The gastric mucosa was further dissected away in this remaining stump to eliminate any secretory activity. The patient made an uneventful recovery and was completely relieved of his symptoms at the time of his dismissal more than a month later. Analysis of the gastric contents three weeks after operation revealed from 10 to 15 units of free hydrochloric acid in the fasting contents of the stomach, which increased to 60 units following stimulation with 0.5 mg. of histamine.

The failure to produce relative achlorhydria is due first to the fact that this patient had a virulent type of perforating ulcer. In the study mentioned previously, it was shown that in only about 50 per cent of cases does relative achlorhydria develop after gastric resection has been performed for duodenal ulcer which has previously perforated. The second reason for failure to produce relative achlorhydria was, we believe, the inability to remove the pylorus in this case.

However, it must be recalled that 25 per cent of patients, following gastric resection for duodenal ulcer in which care is taken to remove the entire pylorus, will fail to show relative achlorhydria. The possibility that in this group lies the greater number of those that have recurring marginal ulcers must be considered. Nevertheless the number of patients that had subsequent marginal ulcers in a series reported by Walters, Lewis and Lemon [6] is about 2 per cent in 212 cases. But there is evidence that those patients who demonstrate recurrence are those who show poorer results from resection so far as acid reduction is concerned. Furthermore, those patients who subsequently have marginal ulcers after gastroenterostomy and are therefore a selected group are definitely less amenable to resection. Walters and Cleveland [7] reported that only 76.1 per cent of patients undergoing gastric resection for bleeding marginal ulcer were apparently cured, as against 94.4 per cent undergoing gastric resection for bleeding duodenal ulcer.

That the stomach following resection is capable of secreting acid is to be expected, since a large number of acid glands remain in the fundus. Under the stimulation of histamine practically every stomach which was resected can be demonstrated to contain free hydrochloric acid.

Nineteen patients suffering from primary duodenal ulcers on whom resection was performed were given histamine (0.5 mg.). In each of these patients no free hydrochloric acid had been present in the fasting contents of the resected stomach. However, after the administration of histamine, free hydrochloric acid was absent in only 1 instance. This patient had had considerable postoperative retention and it is reasonable to assume that the associated deficiency state plus gastritis was responsible for the achlorhydria. In 3 other patients

5. Friedell, M. T.: Partial Resection of the Stomach: The Effect of Its Extent on Gastric Acidity: A Preliminary Report, Proc. Staff Meet., Mayo Clin. **16**: 193-197 (March 26) 1941.

6. Lewis, E. B., and Lemon, R. G.: Partial Gastrectomy for Duodenal Ulcer: A Report of 212 Cases, Proc. Staff Meet., Mayo Clin. **15**: 765-766 (Nov. 27) 1940. Walters, Waltman, in discussion, ibid., pp. 767-768. Walters, Waltman; Lewis, E. B., and Lemon, R. G.: Primary Partial Gastrectomy (Polya Type) for Duodenal Ulcer: A Study of Results in 212 Cases, Surg., Gynec. & Obst. **71**: 240-243 (Aug.) 1940.

7. Walters, Waltman, and Cleveland, W. H.: Results of Partial Gastrectomy for Bleeding Duodenal, Gastric and Gastrojejunal Ulcer, Ann. Surg. **114**: 481-497 (Oct.) 1941.

tested at ten minute intervals for one hour after the injection of histamine, free hydrochloric acid was found in only one ten minute sample in each patient. In 1 patient forty minutes after the injection of the histamine only 10 units of free hydrochloric acid was found. In another patient 4 units was found twenty minutes after

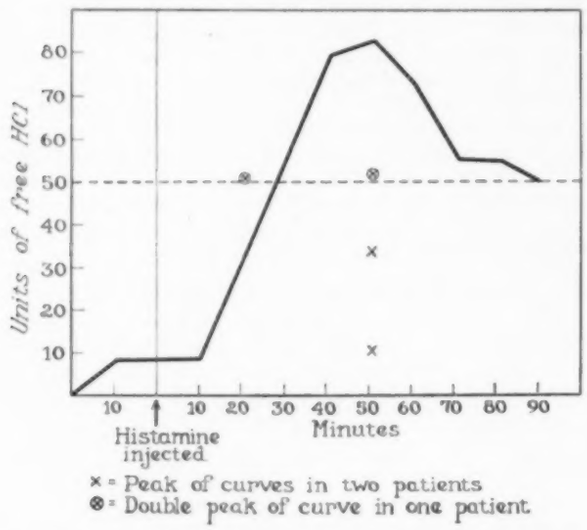

Chart 1.—Peak of acid curves in the contents of the stomach following injections of histamine of patients undergoing gastric resection. These patients had all had previous closure of a perforated duodenal ulcer.

injection of histamine and, in still another, 10 units was found fifty minutes after injection of histamine. These 3 patients, to all intents and purposes, can be considered achlorhydric. Thus, from the material available it may be roughly concluded that 75 per cent of patients undergoing gastric resection will have relative achlorhydria and that of these about 25 per cent will have practically absolute achlorhydria.

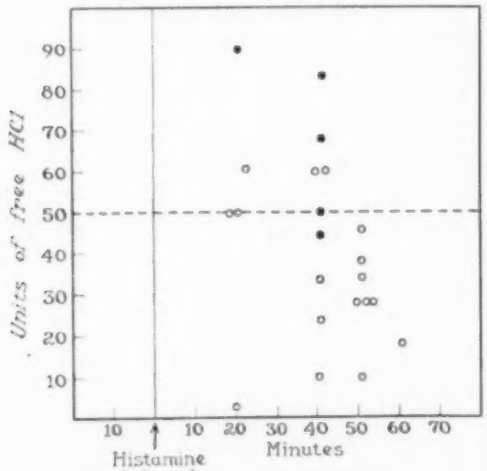

Chart 2.—Distribution of peaks of acid curves following administration of histamine to 23 patients undergoing primary resection for duodenal ulcer. Fifty units was chosen as a convenient and fairly accurate demarcation between a normal and a hyperactive response.

It has been mentioned that an ulcer which had previously perforated was of a more "virulent" type and that patients with this situation were less prone to have relative achlorhydria. Four patients in whom this condition was encountered were studied following resection. Three of the patients had relative achlorhydria; 1 did not. The data are therefore not sufficient, but there is some increased response to histamine as is shown in the chart of the histamine curves (chart 1). The 1 patient who demonstrated free hydrochloric acid in the resected stomach showed a particularly strong response to stimulation with histamine.

In a previous study it was shown that removal of more than half of the stomach gave only a slight increase of the frequency of occurrence of relative achlorhydria. Histamine tests show little difference in variation of secretion of free hydrochloric acid in relation to the extent of resection. Of 4 patients in whom no free acid was found in the fasting contents of the stomach, the concentration of free acid rose to more than 50 units in only 1. (The level of 50 units was chosen since, as is shown in chart 2, it formed a convenient level of demarcation between apparently normal and marked response to histamine stimulation.) Each of these patients had had only a minimal resection, that is, about half of the stomach, including the pylorus and antrum.

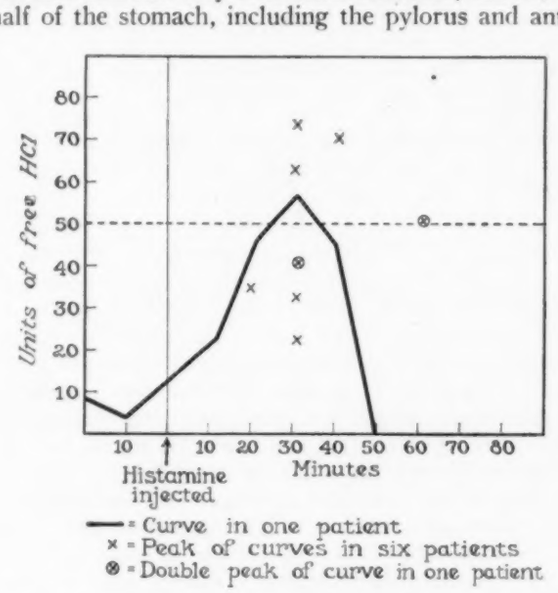

Chart 3.—Histamine gastric acid curves of 8 patients undergoing gastric resection for gastrojejunal ulcer. One patient had free hydrochloric acid in the fasting contents of the stomach.

In 15 patients who had had apparently more extensive resection, the free hydrochloric acid after histamine stimulation rose to more than 50 units, although not to more than 60 units.

RESECTION FOR GASTROJEJUNAL ULCER

Clinically, these cases represent a selected group (since in only a fraction of cases in which gastroenterostomy is performed for duodenal ulcer do gastrojejunal ulcers subsequently develop). Following resection, they yield less satisfactory results than the other cases as far as acid reduction is concerned. Thus, after histamine tests the acid concentration in 3 cases in which there was no free hydrochloric acid in the stomach rose to more than 60 units, and in another it was more than 50 units. Only 1 patient in the group of 8, however, had free hydrochloric acid in the resected stomach. His response to histamine stimulation was somewhat greater than normal with a peak of 58 units of free hydrochloric acid in thirty minutes (chart 3). In all these cases a particular effort was made to perform as high a resection as was compatible without increasing greatly the surgical risk. In spite of the

increased extent of resection these patients did not show any improvement in reduction of acidity, and, in fact, there was a tendency to respond more vigorously to histamine stimulation.

SIGNIFICANCE OF PRESENCE OF FREE HYDROCHLORIC ACID IN THE FASTING CONTENTS OF THE STOMACH

By far the most significant factor in the entire study was the presence of a trace of free hydrochloric acid in the fasting contents of the stomach. In these cases the concentration of free hydrochloric acid rose rapidly and reached peaks higher than in any other type of curve (chart 4). The highest concentration was 90 units in a patient who had a concentration of 28 units in the contents of the fasting stomach. Furthermore, in almost all cases the acid concentration was fairly well sustained. This uniform tendency to higher concentration of free hydrochloric acid following stimulation with histamine indicates the importance of obtaining at least relative achlorhydria following gastric resection. The

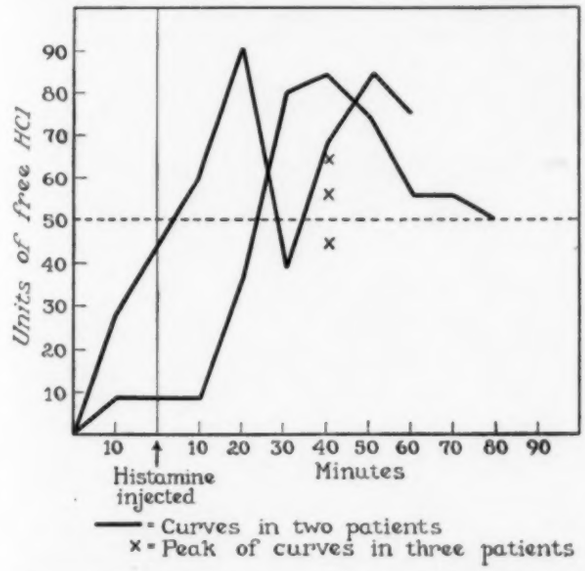

Chart 4.—Effect of the presence of free hydrochloric acid in the fasting contents of the stomach on the response to histamine. Note the uniformly strong concentration of acid.

fact that 25 per cent of patients suffering from duodenal ulcer who undergo gastric resection do not obtain relative achlorhydria indicates that, while gastric resection is an advance in the treatment of duodenal ulcer, it is not always a certain means of eliminating the acid factor. Chart 1 illustrates the histamine stimulated acid concentration in the resected stomach of a patient who had had previous perforation of his ulcer and in whom 8 units of free hydrochloric acid was found in the fasting contents. The strong and persistent concentration of free acid following histamine stimulation is an indication why the prognosis may be less favorable in these cases.

REACTIONS OF THE ACID SECRETORY MECHANISM OF THE RESECTED STOMACH TO HISTAMINE STIMULATION

The response to histamine stimulation is various: (1) No free hydrochloric acid may be demonstrated after administration of histamine in a few cases, (2) the concentration of free hydrochloric acid may rise to a peak and then fall to zero, the so-called single peak curve (chart 5) or (3) the curve may present two peaks (chart 6). The rise of acidity may cause distress, as in 1 patient in whom the test was discontinued following the development of symptoms similar to his previous ulcer distress. In this instance the acid concentration had risen to 64 units.

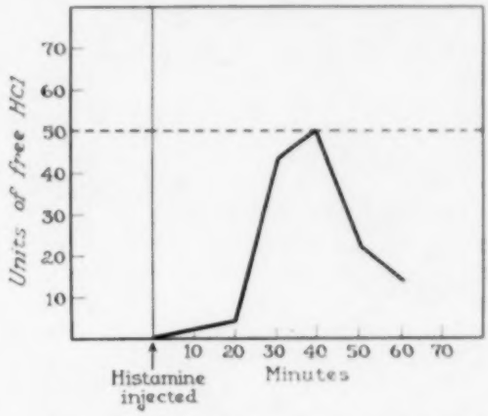

Chart 5.—Typical single peak type of acid curve.

COMMENT

The various hypotheses about the causation of peptic ulcer have received sufficient comment. The only factor of importance in which surgical management can play a part is the reduction of the acid content of the stomach. The importance of this as an etiologic agent in the production of peptic ulcer has received recent comment in an editorial in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. Only a small percentage of patients who have peptic ulcer ever receive surgical treatment and often this is because of complications resulting from the ulcer, such as hemorrhage, perforation or obstruction. Gastroenterostomy often will suffice to relieve the symptoms of duodenal ulcer, but it does not carry with it a sufficient reduction of gastric acidity to insure the prevention of recurrence. Gastric resection, including removal of the pylorus with the lower half of the stomach, is the best method of controlling hyperacidity. When symptoms are intractable and the

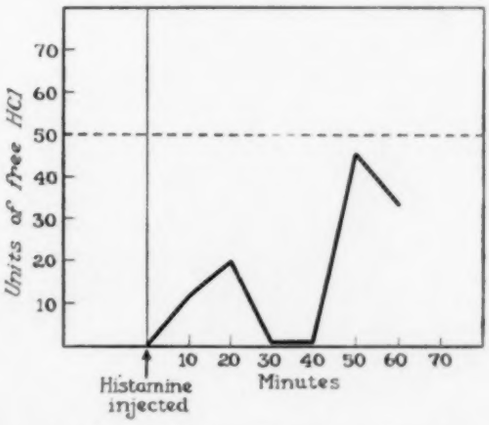

Chart 6.—Double peak type of acid curve.

patient is a young man, it is the best operation, as a rule, available. This is the problem faced in military life and, as has been emphasized recently, this is a serious situation.[5] The solution of this problem lies probably in the surgical management of these ulcers, since medical control in military life is virtually impossible.

The present study has been devoted to evaluating the actual reduction of gastric acidity by means of properly performed and indicated gastric resection. This operation is the best available to minimize the acid content of the stomach as an etiologic agent in gastric ulcer. Even under the stimulation of histamine, a considerable reduction of acidity is evident. That gastric resection is not always entirely successful, however, is also demonstrated. Dangerously high acid levels are still encountered under the influence of histamine stimulation, levels high enough to cause a return of symptoms, as they did in 1 case. The value of obtaining relative achlorhydria has been indicated, since patients who have even a trace of free hydrochloric acid in the resected stomach have acid concentrations uniformly higher than those with relative achlorhydria. Similarly in selected cases, such as those in which there has been previous perforation or in which there is gastrojejunal ulceration, acid concentrations are reduced considerably, but not quite as satisfactorily as in those in which primary resection is being done for duodenal ulcer (a more random selection).

CONCLUSIONS

1. Reduction of gastric acidity is obtained in 75 per cent of cases in which gastric resection is performed for primary duodenal ulcer, which may be considered as affording a good prognosis, since it eliminates the acid factor as an etiologic agent.

2. A trace of free hydrochloric acid in the contents of the stomach following resection indicates a less satisfactory reduction than would seem indicated on the surface, because the response to histamine stimulation is uniformly greater than in those patients obtaining relative achlorhydria.

3. Patients who have an ulcer difficult to control as evidenced by previous perforation or marginal ulceration are also less amenable to surgical treatment than other patients, and gastric resection in such cases should be as thorough as is compatible with surgical risk.

ABSTRACT OF DISCUSSION

DR. WALTMAN WALTERS, Rochester, Minn.: Dr. Shaar called attention to the incidence of ulcers of the stomach and duodenum in the fighting forces of our allies of the British Empire. In a report of 1,000 patients admitted to a hospital in England, 10 per cent of them were admitted as the result of dyspepsia, and of these patients about 50 per cent had ulcers. A significant fact in the study of the English literature was that patients suffering from active ulcers are found to be ineffective soldiers and sailors and are discharged from the service. On the other hand, my understanding is that men who have had partial gastrectomy and who have been free from symptoms are retained in the service. The same plan applies to patients on whom gastroenterostomy has been performed. One must distinguish constantly between the operations performed for gastric ulcers and for duodenal ulcers, because the two lesions are entirely different. As brought out in the paper, resections of the stomach for gastric ulcer are followed in about 100 per cent of the cases by relative achlorhydria. The achlorhydria is relative because stimulation of the gastric secretion by histamine in those cases almost universally shows the presence of hydrochloric acid. On the other hand, when similar types and magnitudes of gastric resection are performed for duodenal ulcer and a Polya type of anastomosis is performed, in only 75 per cent of the cases does relative achlorhydria develop. If patients of a similar type have a section of their stomachs removed and have a Billroth I type of anastomosis, relative achlorhydria develops in only 25 per cent. What is the effect of gastroenterostomy on gastric acid? It is that in 12 per cent of the cases relative achlorhydria develops, as shown by work carried out by Lieutenant Cleveland some years ago. I would call attention to the difference in technic in the Polya and the Billroth operations because of the importance that the Polya, rather than the Billroth, plays in the treatment of duodenal ulcers in which resection is performed. The same amount of stomach is removed, including the first part of the duodenum in which the ulcer is located, but in the operation of Polya the end of the duodenum is closed and peristalsis carries the duodenal, biliary and pancreatic secretions into the stomach. In 75 per cent of cases in which this operation has been done for duodenal ulcer relative achlorhydria will develop. When the same amount of stomach has been removed in cases of duodenal ulcer and the end of the stomach has been sutured to the end of the duodenum, peristalsis carries the alkaline duodenal, biliary and pancreatic secretions into the second and third portions of the duodenum rather than into the stomach. In only 25 per cent of these cases does relative achlorhydria develop. The incidence of recurring ulcer following the Billroth I operation for duodenal ulcer is 5 per cent. In only 4 per cent of cases in which gastroenterostomy has been performed, in which there is a gastric acid dilution factor because of the reflux of the alkaline intestinal secretions into the stomach, does recurring ulcer develop. In the Polya and Billroth operations for gastric ulcer recurring ulcerations do not take place, and probably one of the reasons is that, in both of those types of operations performed for gastric ulcer, relative achlorhydria usually results.

EVIDENCE ON THE GENESIS OF PEPTIC ULCER IN MAN

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NEW YORK

Recent studies have shown that prolonged continuous acceleration of acid secretion in the stomach by the repeated administration of histamine in beeswax results regularly in the development of duodenal ulcer in a wide variety of laboratory and domestic animals.[1] Somewhat earlier it was shown that in dogs the maintenance of hyperacidity by continuous stimulation of the vagus [2] or by continuous sham feeding [3] resulted in ulcer.

While all these stimuli seem to cause ulcer by a common mechanism, namely by effecting a continuous hypersecretion of acid in the stomach, not one of the three is ordinarily operative in human beings subject to ulcer. It was with the purpose of discovering some stimulus which results in definite, sustained acceleration of acid production and which may have been recurrent in the ordinary course of life in ulcer patients that our studies were undertaken. We found that day to day life situations which provoked certain patterns of emotional reaction induced hypersecretion in the stomach comparable to that resulting from prolonged absorption of histamine, vagus stimulation and sham feeding.

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Released for publication by the War Department, Manuscript Board, which assumes no responsibility, other than censorship, for the contents of this article.

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PREVIOUS WORK

Wittkower [4] found that while certain subjects reacted to test situational stimuli by decreased gastric function in line with Cannon's hypothesis,[5] certain others showed accelerated acid production in the stomach. Gordon and Chernya,[6] who studied acid secretion in several human subjects with gastric fistulas, found that one of their subjects whose fasting secretion had previously been within normal limits began to show hyperacidity when he became homesick, restless and resentful of the experimental procedures. More recently Mittelmann and Wolff [7] published a study of normal subjects and patients with peptic ulcer. During periods of experimentally induced anxiety, hostility and resentment, they found a rise in acidity and increased contractions in the stomachs of all the patients suffering from ulcer and in many of the normal subjects. Moreover, they were able to reverse this process and cause a decrease in acidity and motility by inducing in their patients feelings of contentment and well-being.

Reviewing the life histories of the patients with ulcers, Mittelmann and Wolff found that the patients had been subject to prolonged emotional turmoil involving mainly conflict, anxiety, guilt, hostility and resentment. The occurrence of pain and even hemorrhage was correlated with periods of special stress and accentuation of these feelings.

In view of this evidence we undertook studies on a subject whose gastric mucosa could be examined readily for prolonged periods.

METHOD

Our studies have been made on a man aged 56 who at the age of 9 completely occluded his esophagus by drinking scalding hot clam chowder. Since then he has fed himself through a gastric fistula 3.5 cm. in diameter, surgically produced shortly after the accident. It is his custom to put food into his mouth and, after tasting and chewing it, to expectorate it into an ordinary kitchen funnel inserted into his stoma. Through the stoma has protruded on his abdominal wall a collar of gastric mucosa essentially similar to that within the cavity of the stomach. The patient is in excellent health, has rare digestive complaints and is employed as a diener in our laboratory. He is a small, wiry man of Irish-American stock, unschooled, married and the father of one child. He is shy, sensitive, proud, stubborn and slightly suspicious. He is fun loving but very conscientious.

We made estimates of vascular changes by comparing changes in color in the gastric mucosa to a standard color scale, which was calibrated after the method of Munsell. That these variations actually reflect changes in blood flow was shown by measurements with a blood flow recording device reported elsewhere.[8]

The stomach was emptied every fifteen minutes and the juice obtained was analyzed in the usual manner. The output of acid by the parietal cells was estimated with reference to volume and acid concentration and was expressed in cubic centimeters of 0.166 normal hydrochloric acid according to a method of calculation described elsewhere.[9]

In many of the experiments records of the stomach contractions were made by the familiar technic of inflating in the organ a balloon connected to a recording manometer.

Careful note was made of the patient's mood and the content of his thoughts and preoccupations. These data were collected during the experiments as well as at separate daily interviews. An attempt was made to classify the emotional and other reaction patterns as contentment, joy, gratitude, feelings of helplessness, dejection, doubt, fear, frustration, guilt, sadness, anxiety, tension, hostility and resentment. None of these existed alone, but usually it was possible to recognize one or two as dominant. The emotional reactions were then correlated with the various measurements of gastric function.

The emotionally charged situations were not experimentally induced. Spontaneously occurring life situations, problems and conflicts were utilized. Some of these involved events arising from time to time in the laboratory. Others occurred in the setting of the subject's home life. His reaction to each of these experiences

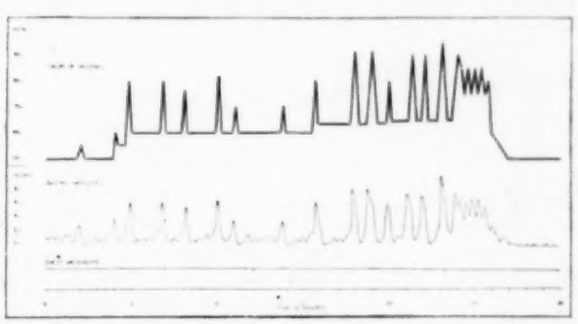

Fig. 1.—A phase of accelerated gastric function showing waves of vigorous contraction and the associated blushing of the mucosa. Acid was being produced at the rate of 4 cc. of hydrochloric acid an hour during the quiescent phase before and after. During the period of vigorous contractions acid production was accelerated to 16 cc. an hour.

was evaluated in the light of his individual personality pattern, which is described in detail in another publication.[9] Thirty-four observations on stomach function accompanying several different affective states were made. From these illustrative examples will be presented.

OBSERVATIONS

Secretion, Motility and Vascularity Under Conditions of Relaxation and Well-Being.—During periods when the subject was relaxed and apparently contented, the color of the mucosa remained relatively constant in the neighborhood of 50. Contractions were usually of low amplitude and rhythmic, making a pattern of three small waves a minute.

Gastric juice accumulated in the stomach at the rate of approximately 8 to 15 cc. an hour. Total acid under these circumstances averaged 50 clinical units. In terms of parietal cell output, according to our calculation, this represents about 3 to 5 cc. of 0.166 normal hydrochloric acid an hour.

Spontaneous Periodic Phases of Accelerated Gastric Function.—Every two to three hours there occurred in the stomach a transitory phase of hyperemia, hypersecretion of acid and vigorous contractions. These followed a rather constant pattern, as shown in figure 1.

4. Wittkower, E.: Studies on the Influence of Emotions on the Functions of Organs (Including Observations on Normals and Neurotics), J. Ment. Sc. **81**: 533 (July) 1935.

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8. Richards, C. H.: Wolf, Stewart, and Wolff, H. G.: The Measurement and Recording of Gastroduodenal Blood Flow in Man by Means of a Thermal Gradientometer, J. Clin. Investigation, to be published.

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and lasted only twenty to thirty minutes. After the phase of accelerated gastric function had subsided the stomach assumed its former "basal" condition. The changes obtained during test situations were carefully evaluated with regard to these periodic phases of spontaneous gastric hyperfunction.

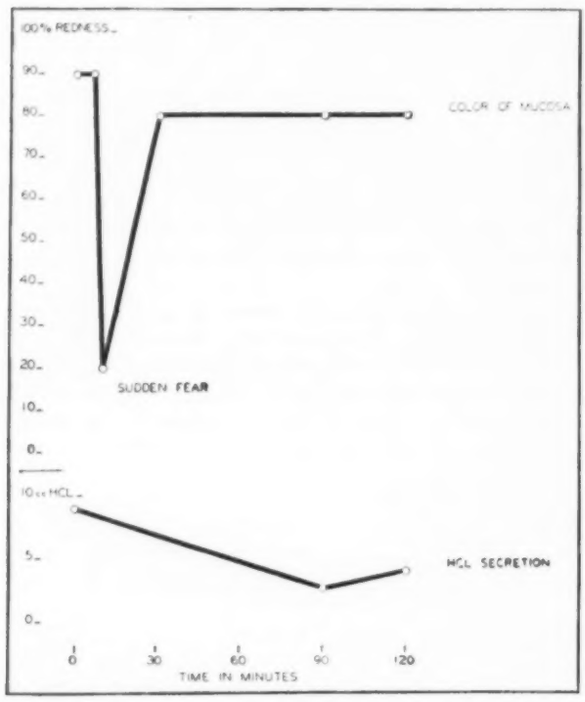

Fig. 2.—Pallor of the gastric mucosa and decreased rate of acid secretion accompanying fear.

Correlation of Gastric Function, Acid Production, Motor Activity and Vascularity.—Combined measurements of the rate of acid secretion, gastric contractions and vascularity were made under a wide variety of circumstances and after various stimuli. At all times increased acid production was accompanied by hyperemia, and hyperemia always indicated increased acid production. Vigorous contractions, while they did not always accompany hyperemia, did not occur when the stomach was pale.

Depression of Gastric Function in Association with Fear and Sadness.—Fear: The patient suddenly experienced intense fear one morning in the midst of a phase of accelerated gastric function. An irate doctor entered the room muttering imprecations about an important protocol which had been lost. Our patient had mislaid it and feared that he had lost the record and his job. He lay motionless on the table and his face became pale. Prompt and decided pallor occurred also in his gastric mucosa, and associated with it there occurred a fall in the rate of acid production. A minute later the doctor found his paper and left the room. Forthwith the face and gastric mucosa of our patient regained their former color (fig. 2).

Sadness: Sadness, dejection and feelings of self reproach were accompanied in our subject by taciturnity, lack of "energy," slowness of movement of the body generally and by pallor of the gastric mucosa, decreased acidity and motor activity. Even the stomach's normal response to the ingestion of food was inhibited under these circumstances.

One morning the patient was depressed and uncommunicative over having lost through his own negligence an option on a house which he had long been eager to acquire. He was limp and dejected and filled with feelings of self depreciation and refused to relate the nature of his trouble until several hours later. We administered beef broth directly into his stoma and noted that the hyperemia and acceleration of acid production and motility, which regularly followed ingestion of beef broth, were partially inhibited. Figure 3 shows normal response to beef broth and figure 4 the response obtained during sadness and dejection.

Acceleration of Gastric Function in Association with Emotional Conflicts Involving Anxiety, Hostility and Resentment.—During a period of "basal function" of the stomach one-half hour after a spontaneous phase of accelerated function, a member of the staff entered the room to pay off and discharge our subject from a job he was doing for the doctor after hours in order to earn extra money. The doctor had complained earlier that he was slow, ineffective and charged too much. The subject, who takes great pride in his conscientious attitude toward all duties, resented heartily these charges. When the physician told him he need not report for work any more he accepted the rebuff politely, but quickly his stomach became red and engorged and soon the folds were thick and turgid. Acid production accelerated sharply and vigorous contractions began. This happened despite the fact that another spontaneous phase of accelerated gastric function was not to be expected for at least an hour and a half (fig. 5).

We noted these changes frequently in association with feelings of strong hostility and resentment on the part of the patient, and also with anxiety. It is noteworthy that these incidents occurred far more commonly than did those described earlier, in which there was an associated inhibition of secretion, motor activity and vascularity.

The degree and duration of the changes in gastric function were also roughly proportional to the intensity and duration of the emotional reaction.

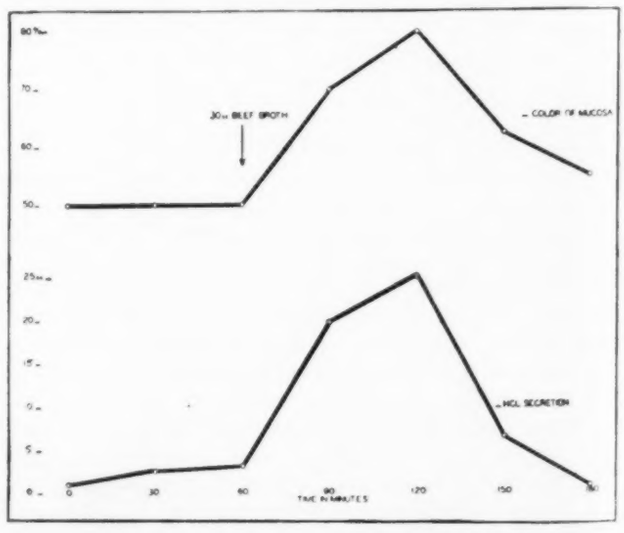

Fig. 3.—Usual response to ingestion of beef broth.

An illustration of prolonged acceleration of gastric function is as follows: The patient was usually in a state of comparative financial insecurity, and because of this he was compelled to accept gifts from a certain benefactor. The latter meddled in our subject's personal affairs and when denied a hand in managing them threatened to withdraw support. During two weeks

of much meddling our patient became intensely anxious about his future welfare and resentful of the activities of his benefactor. He was eager to throw off his dependence. At the end of the two weeks the opportunity for release came in the form of a raise in pay for his job at the hospital. This good fortune he received with the deepest feelings of relief. Figure 6 shows the average levels of acid production and color of the mucous membrane of his stomach during the two weeks of emotional turmoil and during the two weeks preceding and the two following it.

Gastritis, Pain and Mucosal Erosions.—In the presence of hypermotility and hypersecretion, the gastric mucous membrane not only became red but engorged and turgid as well. The folds became thicker and succulent and the lining of the stomach presented the picture designated by gastroscopists as "hypertrophic gastritis."

During periods when his stomach was in this state, occurring as they did in association with emotional conflicts involving anxiety, hostility and resentment, the patient often complained of heartburn and abdominal pain. Indeed it was possible to demonstrate experimentally that the tissues of the stomach wall were more sensitive to pain in their hyperemic state than normally. Vigorous contractions of a magnitude insufficient to cause pain in its normal state were painful when the stomach was intensely engorged.

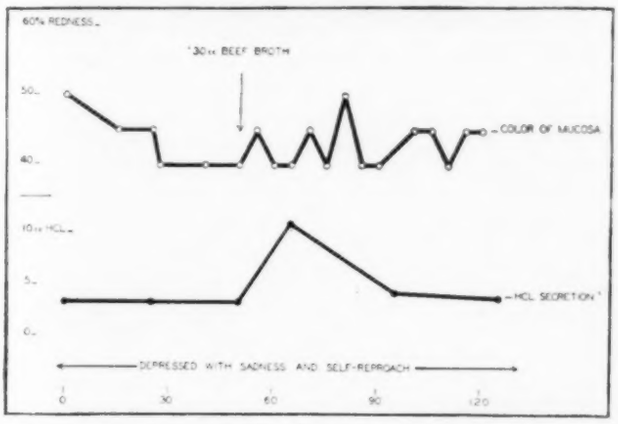

Fig. 4.—Inhibition of beef broth effect during sadness and dejection.

Furthermore, the susceptibility of the mucosa to injury resulting in hemorrhage was found to be greatly enhanced in this condition of engorgement and hyperemia. Even relatively trifling traumas such as striking the membrane with a glass rod or stroking it with dry gauze resulted in small erosions and bleeding points. Frequently during periods of such hyperemia vigorous contractions produced bleeding points around the periphery of the exposed collar of mucosa without the necessity of instrumentation.

Healing in the Stomach: The Protective Properties of Mucus.—Ordinarily these small erosions and bleeding points which occurred from time to time were quickly covered with mucus and healed uneventfully in twenty-four hours or less. The failure of any of these lesions to persist as a chronic ulceration will be shown to be due largely to the effective protection afforded by the mucus.

When irritating substances such as mustard, strong acid or alkali were placed on the lining of the stomach without pains being taken to remove the mucus coating, only a slight to medium erythema resulted. When the accumulation of protective mucus was continually aspirated away, however, and mustard was applied directly to the cells of the mucosa, acute inflammation and edema resulted. Bleeding points and small erosions appeared throughout the area involved. Pinching and faradic stimuli applied to the mucosa in this condition caused pain, although pain did not occur when these stimuli were applied to the mucosa in its normal state.

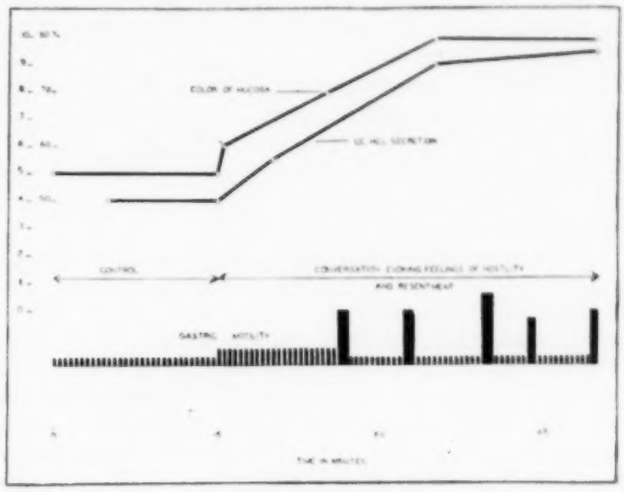

Fig. 5.—Accelerated gastric function accompanying emotional conflict involving feelings of hostility and resentment.

The protective powers of mucus have been shown to consist of three distinct mechanisms: First, it presented a continuous slippery surface to irritants. Second, by combining with and neutralizing the acid in immediate contact with it, it maintains the acidity of the stomach lining itself at a relatively low level. When a drop of Toepfer's solution was allowed to fall on the wall of the stomach it failed to indicate an acid reaction despite the fact that a sample from a nearby pool of accumulated gastric juice contained 65 units of titratable free acid. An important aspect of this protective device is the fact that mechanical and chemical irritation of the gastric mucosa as well as the presence of acid in high concentration in the stomach accelerates the rate of production of mucus. Circumstances arose, how-

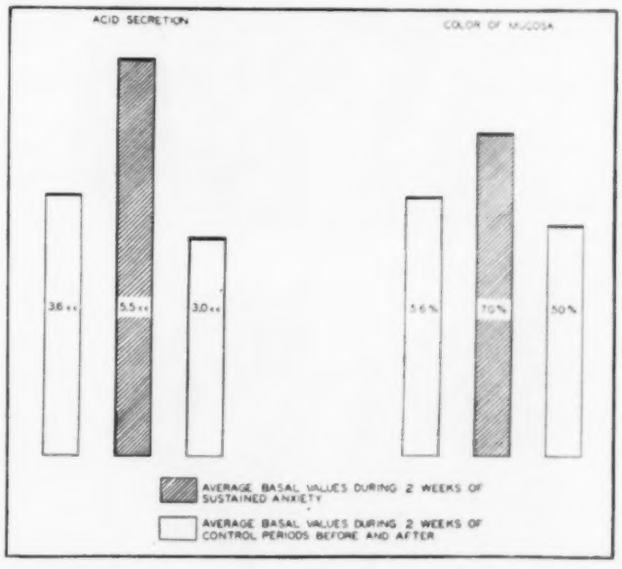

Fig. 6.—Prolonged gastric hyperfunction accompanying sustained anxiety for two weeks.

ever, when the amount of acid in the stomach exceeded the powers of this compensatory mechanism. Then the third protective property of mucus was invoked. The mucus precipitates and forms an insoluble, continuous, tough, membranous coating over the cells of the gastric mucosa, thus insulating them from chemical attack.

In the duodenal cap the protection afforded the cells is far less elaborate, and whatever mucus does cover the cells is likely to be brushed aside by food. Thus the corrosive contents of the stomach can gain access to the base of a minor erosion.

Result of Continued Contact of Gastric Juice with a Mucosal Erosion.—To demonstrate the effects of contact of gastric juice with an eroded surface, we conducted the following experiment:

Two small bleeding points were produced in the gastric mucosa by traumatizing it with a smooth-edged forceps. These tiny eroded areas were kept in contact with gastric juice of a titratable total acid of 90 units for one-half hour. The protective mucus which accumulated rapidly in this region was sucked away frequently and fresh gastric juice applied. A sharp acceleration of acid secretion and concomitant hyperemia of the whole gastric mucosa resulted from this procedure, and these effects persisted for one-half hour after the exposure of the erosions to the action of gastric juice had been stopped. After the undisturbed lesions had become covered by mucus the color and acid values returned to normal.

This experiment supports the idea that the acceleration of acid secretion resulting from erosions being bathed in gastric juice is one mechanism involved in the maintenance of hyperacidity in patients suffering from peptic ulcer.

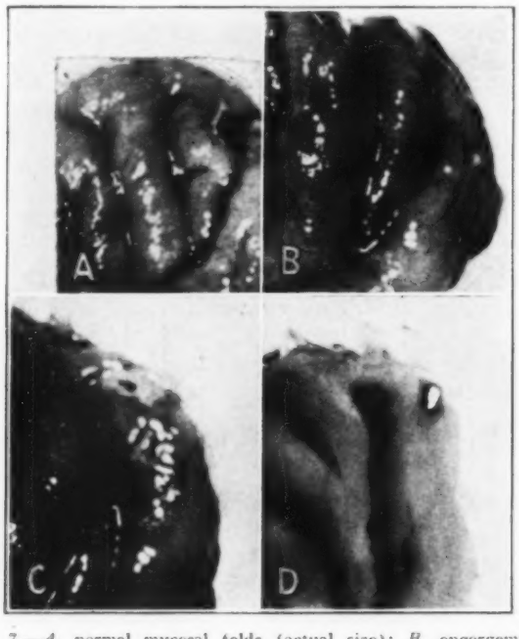

Fig. 7.—*A*, normal mucosal folds (actual size); *B*, engorgement of mucosa accompanying emotional conflict (actual size); *C*, mucosal erosion (actual size); *D*, punched out ulcer resulting from prolonged contact of gastric juice with an area of mucosa inadequately protected by mucus (actual size).

Gastric Juice and Chronic Tissue Damage.—On the peripheral border of the collar of mucous membrane which lay exposed on the patient's abdominal wall a situation similar to that encountered in the duodenal cap prevailed. Here, owing to defective production of mucus, there was little or no protective covering over the mucosa. This state of affairs enabled us to test the consequences of inadequate supply of insulating mucus by the following experiment:

A small erosion which occurred in this region was continuously subjected to the action of the patient's own gastric juice for four days.

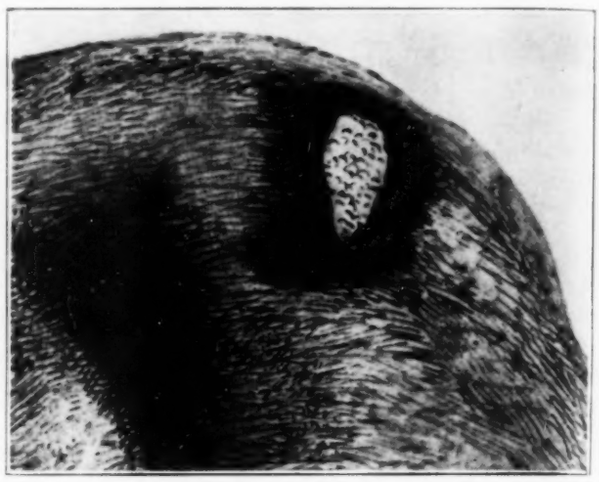

Fig. 8.—Drawing of ulcer shown in figure 7 *D* (enlarged five times).

Within twenty-four hours the denuded surface had increased in size. The base of the lesion became deeper and it bled intermittently. At the end of four days it measured 4 mm. in diameter and presented the punched out appearance of a chronic peptic ulcer with well defined edges and a granulating base (figs. 7 and 8). Traction or pressure applied to the lesion caused pain. While this lesion was present the whole mucosa remained relatively engorged, and acid production was maintained at a high level.

After four days the ulcer and surrounding area were covered by a protective petrolatum dressing and thus isolated from the gastric juice. Complete healing took place within three days, leaving no grossly recognizable trace of the lesion behind.

Thus it has been shown that when an unprotected mucosal erosion is exposed to the digestive action of gastric juice additional tissue damage occurs and chronic ulceration results.

COMMENT

The difference between a hypersecreting stomach and actual gastritis is, as we have shown, mainly one of degree. Prolongation of inordinate hypersecretion in the stomach with the inevitable accompanying hyperemia, then, carries with it the hazard of possible structural damage to the lining of the stomach or even more likely to that of the duodenal cap, since the latter is less well protected.

Once an erosion has been effected, contact of acid gastric juice with the denuded surface would perpetuate the vicious cycle as illustrated in the experiment described.

We have shown that situational factors resulting in emotional conflict with anxiety, hostility and resentment may induce in the stomach profound and prolonged hyperemia, hypermotility and hypersecretion. Adequate neural mechanisms exist to explain these phenomena, and indeed experimental ulcers have been produced in animals by lesions in the brain stem,[10] by prolonged stimulation of the vagus [2] and by infusion with acetylcho-

10. Fulton, J. E.: Physiology of the Nervous System, London, Oxford University Press, 1938, p. 253.

line.[11] The necessity for the gastric hyperfunctioning to be sustained as well as pronounced is apparent in the failure of large repeated doses of histamine in aqueous solution to result in ulcer.[12] When a sustained effect was obtained, however, by administering the drug in a slowly absorbed medium, peptic ulcer regularly resulted.[13] The reason why our patient has not acquired peptic ulcer may be that the hyperemia and hypersecretion which we have observed in the presence of conflict have been relatively transitory. He is not the sort of person who harbors grudges or maintains emotional stress for prolonged periods. Usually he expressed his feelings either in words or in action, and his more serious conflicts were relatively short lived. Since the occurrence of gastric hyperfunction in certain emotional settings has been demonstrated, however, and since the destructive power of excessive gastric secretion has been established, one may infer that these emotionally charged situations are involved directly in the genesis of peptic ulcer in man. Hyperacidity, gastritis, minor mucosal erosions and finally peptic ulcer occurring during the course of sustained emotional tension should not be looked on as separate clinical entities. The evidence indicates that they are all phases of the same pathologic process.

SUMMARY AND CONCLUSIONS

A patient with a large gastric fistula whose mucosa is readily accessible to view has been studied with regard to the possible genesis and persistence of tissue damage. It was found that:

1. Acid in small amounts was continuously elaborated in the subject under basal conditions.

2. Spontaneous transitory phases of accelerated secretion of acid occurred from time to time. These were accompanied by blushing of the mucous membrane and vigorous contractions of the stomach wall.

3. Emotions such as fear and sadness, which involved a feeling of withdrawal, were accompanied by pallor of the gastric mucosa and by inhibition of acid secretion and contractions. This complex was encountered infrequently in our subject.

4. Emotional conflict involving anxiety, hostility and resentment was accompanied by accelerated acid secretion, hypermotility, hyperemia and engorgement of the gastric mucosa resembling "hypertrophic gastritis." This series of events was much more commonly observed in our subject. It was associated with gastrointestinal complaints of the nature of heartburn and abdominal pain.

5. Intense sustained anxiety, hostility and resentment were found to be accompanied by severe and prolonged engorgement, hypermotility and hypersecretion in the stomach. In this state mucosal erosions and hemorrhages were readily induced by even the most trifling traumas, and frequently bleeding points appeared spontaneously as a result of vigorous contractions of the stomach wall.

6. Contact of acid gastric juice with such a small eroded surface in the mucous membrane resulted in accelerated secretion of acid and further engorgement of the whole mucosa. Prolonged exposure of such a lesion to acid gastric juice resulted in the formation of a chronic ulcer.

7. The lining of the stomach was found to be protected from its secretions by an efficient insulating layer of mucus, enabling most of the small erosions to heal promptly within a few hours. Lack of such a protective mechanism in the duodenal cap may explain the higher incidence of chronic ulceration in this region.

8. It appears likely, then, that the chain of events which begins with anxiety and conflict and their associated overactivity of the stomach and ends with hemorrhage or perforation is that which is involved in the natural history of peptic ulcer in human beings.

525 East Sixty-Eighth Street.

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PULMONARY TUBERCULOSIS MASQUERADING AS LARYNGITIS

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PHILADELPHIA

My purpose in this paper is to call attention to or promote wider recognition of the fact that pulmonary tuberculosis may first be manifested by laryngeal symptoms. It is not to be construed that the tuberculous process originates in the larynx, because it is axiomatic today that laryngeal tuberculosis is always secondary to a pulmonary focus. Unlike hemoptysis, which is so alarming to the patient and significant to the physician, the presence of either chronic hoarseness or sore throat is frequently disregarded as a serious warning by both patient and consultant.

While the incidence of laryngeal symptoms antedating pulmonary or systemic signs is small, nevertheless a review of the history and laryngeal examination of 1,800 patients observed at the White Haven Sanatorium revealed that the cart came before the horse in 26 of these patients, or a frequency approximating 1.5 per cent. It would have been instructive to know the interval of time that elapsed between the onset of the laryngeal symptoms and the discovery of the pulmonary lesion, but circumstances prevented the obtaining of this information. The data, however, were available in several instances, and it is my impression that three or four months elapsed in the average case before adequate diagnostic measures were instituted. It is not maintained in this report that the patients' symptoms were exclusively laryngeal, because occasionally the discerning practitioner uncovered latent pulmonary and systemic signs. It is held, however, that in the great majority of cases the initial symptom of hoarseness or sore throat so predominated the clinical picture that priceless time was lost either in observation or in local therapy before the pulmonary lesion was discovered.

SYMPTOMS AND DIAGNOSIS

The insidious onset of pulmonary tuberculosis is well illustrated in this selected group of patients whose apparent well-being was the chief misleading factor in the diagnosis. Of the 26 patients with laryngeal tuberculosis at the time of admission to the sanatorium 16 had hoarseness, 4 complained of a sore throat while the remaining 6 had both symptoms. I cannot state

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with certainty that at the onset of their illness the lesions were tuberculous, but in view of the subsequent events, i. e. increased severity of symptoms, it is quite reasonable to assume that the laryngeal involvement was specific from the beginning. The average duration of the laryngeal symptoms or the time that elapsed between the onset of illness and admission to the sanatorium was six months. The following studies,

TABLE 1.—*Age and Sex of Patients*

Age	Male	Female	Total
15-20	0	1	1
21-30	6	5	11
31-40	2	3	5
41-50	5	0	5
51-60	2	0	2
60-75	2	0	2
Total	17	9	26

therefore, must be viewed in the light of this interval. According to the Standards of the National Tuberculosis Association, the severity of the symptoms of these 26 patients may be grouped as follows: The condition of 11 was severe, of 8 moderate and of 7 slight. The sputum of 21 was positive and of 5 negative. The sedimentation rate was determined in 18 of the patients and ranged from 13 mm. to 35 mm., with an average of 23 mm. These patients were observed during a seven year period, and at the present time 19, or approximately 73 per cent, have died and 7, or 27 per cent, have been classified as apparently cured. In the latter group it is found that only 1 patient had a severe grade of toxicity manifested by a rapid pulse and a temperature elevation of over 2 degrees F. Two of the 7 patients exhibited a moderate toxemia with a fever of less than 2 degrees F., while the remaining 4 had only slight constitutional symptoms with a slight cough and fatigue and a temperature elevation of less than 0.5 degree F. Of the 5 patients with negative sputum 4 were in this apparently cured group of 7 patients. In other words, the sputum was positive in only 3, or 42.8 per cent, while in the fatal group of 19 the sputum was positive in 18, or 94.7 per cent.

I thought that a further consideration of the length of illness prior to sanatorium regimen and collapse therapy might be of value if the 19 cases of fatal involvement were compared with the 7 in which there was an apparent cure, but again I found that the average length of incapacity was six months in each group. However, it should be pointed out that the group of 7 apparently cured patients included a middle aged man with a tuberculoma of the left ventricle who had been ill for eighteen months before admission to the sanatorium. If one were to exclude this long-standing case in our estimate of the ill period one would find that adequate treatment was begun in 6 out of the 7 cases of apparent cure two months earlier than in the 19 fatal cases. It appears therefore that if the symptoms of laryngitis which occasionally herald the onset of pulmonary tuberculosis were recognized sooner and followed by modern therapy the prognosis would be favorably influenced.

Unfortunately in this group of cases the diagnosis was not made until the telltale pulmonary and systemic symptoms developed. Generally it was the advent of cough, fatigue, loss of weight and fever that awakened in the mind of the practitioner the possibility of pulmonary tuberculosis. With the discovery of the pulmonary focus by means of either roentgen, fluoroscopic or sputum examination it was presumptively concluded that the laryngeal disorder was also tuberculous. Subsequent events proved in all instances that the practitioner was correct in predicating the laryngeal disease as a complication of the pulmonary focus. Since laryngeal tuberculosis is so rarely encountered in general practice, it hardly seems warranted in this report to dwell on the diagnostic points by which the lesion might have been diagnosed through mirror examination. Suffice it to say at this time that when the least doubt is present the finding of a definite chronic lesion anywhere in the larynx should immediately call for roentgen studies of the lungs and sputum examination to rule out pulmonary tuberculosis.

The age and sex of the patients summarized in table 1 show approximately twice as many men (17) as women (9) whose initial symptom of pulmonary tuberculosis was referred to the larynx. The preponderance of the male sex in this series is all the more noteworthy since in our institution the usual laryngeal complication is only 7 per cent greater among men than among women. The large number (11) in the third decade was to be expected, since pulmonary tuberculosis is most prevalent during this period. The youngest patient in the group was a girl aged 16 while the oldest was a man aged 73. The average age of the males was 40 and of the females 27. Particular attention should be drawn to the 9 cases in men past middle life, since the diagnosis of tuberculous laryngitis had necessarily to exclude a malignant condition and syphilis. The summary shows therefore 26 patients out of 1,800 whose insidious onset of pulmonary tuberculosis was ushered in by either hoarseness or sore throat. The incidence of approximately 1.5 per cent is high when compared to the report of Stevenson and Heaf,[1] who found only 18 similar cases in their investigation of 2,831 patients. In 1,000 cases of laryngeal tuberculosis reported by Myerson[2] 25 presented laryngeal symptoms as the first sign of disease.

An appreciation of the pulmonary status of the patient is essential in the proper management of laryngeal tuberculosis. In table 2 are summarized the roentgen findings of Drs. John T. Farrell and E. Robert Wiese of the White Haven Sanatorium staff showing

TABLE 2.—*Roentgen Findings*

Extent and Type of Disease	Male	Female	Total
Moderately advanced	8 (30.8%)	4 (15.3%)	12 (46.1%)
Exudative	3	1	4
Productive	5	2	7
Mixed exudative	0	1	1
Far advanced	9 (34.6%)	5 (19.3%)	14 (53.9%)
Exudative	2	2	4
Productive	6	2	8
Mixed productive	0	1	1
Miliary	1	0	1
Total	17 (65.5%)	9 (34.5%)	26 (100%)

the extent and type of pulmonary lesions grouped according to the Standards of the National Tuberculosis Association. Of the 26 cases 12 were moderately advanced and 14 were far advanced. The absence of any minimal lesion was rather surprising in view of the fact that the pulmonary tuberculosis in 3 instances was discovered five, six and seven weeks respectively after the initial onset of laryngitis. It is evident from

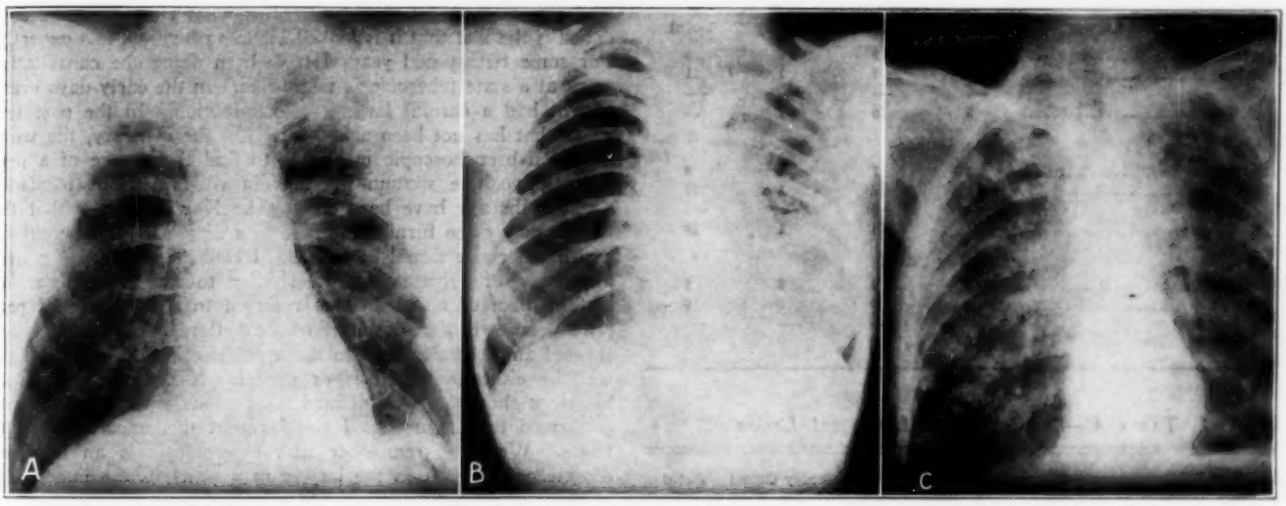
1. Stevenson, R. S., and Heaf, F. R. G.: Tuberculous Laryngitis: An Analysis of Four Hundred and Twenty-Eight Cases, Brit. M. J. **1**: 164-169 (Feb. 3) 1940.

2. Myerson, M. C.: Some Phases of Tuberculosis of the Larynx, Ann. Otol., Rhin. & Laryng. **48**: 707 (Sept.) 1939.

this small series that while hoarseness or sore throat may first herald the advent of pulmonary tuberculosis it is by no means an early sign.

Based on the pathogenesis of the pulmonary lesion, the terms exudative and productive are used to describe the two main types into which tuberculosis is roughly divided. According to Ornsteen and Ulmar,[3] the exudative reactions are characterized by a high tissue sensitivity to the tuberculous antigen, so that there is an immediate explosive reaction whenever the tissue of the host comes in contact with the tubercle bacilli. The response is chiefly serous, with but little fibrin and a small amount of cellular element. On the other hand, when the tissue sensitivity is low and the dose of tubercle bacilli is small the response is productive rather than exudative. The reaction is cellular and there is a typical tubercle formation with epitheloid, giant cell and fibroid changes. When speaking of an exudative or productive lesion, it is generally implied that the lesion is predominantly exudative or predominantly productive. If one reclassifies the two mixed types of lesions shown in table 2 into productive and exudative, there are a total of 16, or 61.5 per cent, productive lesions and 9, or 34.5 per cent, of the exudative type. The preponderance of the productive type was not unexpected in view of the observations of Ornsteen and his associates,[4] who in referring to the productive type of lesion state that because of its avascularity it is apt to give relatively few symptoms, and they further add that the patient may present himself only because of some emphysema or laryngeal or intestinal involvement. This occurred when a man aged 47 in our series sought the advice of his physician because of hoarseness and sore throat. After a relatively short illness of seven weeks the diagnosis of far advanced tuberculosis was made. The lesion of the producing type is demonstrated in the illustration (*A*). The mirror examination of the larynx showed an infiltration of both vocal cords and edema of the epiglottis. His death followed five months after onset of his initial symptoms. As will be shown later, the extrinsic laryngeal involvement in this case augured a grave prognosis.

The finding of 9 cases of exudative type deserves special mention, since a review of the literature does not show this type of pulmonary lesion associated with primary laryngeal manifestations. A typical example of an exudative type of tuberculosis masquerading as laryngitis was found in a woman aged 21 years who in the spring of 1940 consulted her physician because of hoarseness. Internal medication was prescribed. A month or two later another physician diagnosed her condition as chronic laryngitis. Unimproved after a few more weeks, she sought advice from a third consultant, who likewise prescribed internal medication combined with local therapy. This plan of treatment was continued through the summer months until the early part of September, when hemoptysis developed. The roentgen examination at this time revealed a far advanced unilateral exudative type of lesion, as shown in *B*. The mirror examination of the larynx showed an infiltration of both cords in the region of the vocal process. This patient responded well to collapse therapy, gaining 24 pounds (11 Kg.), and is now in the apparently cured group. A subsequent history from the patient revealed the presence of a cough from the early onset of her illness, but like others in the series this symptom was masked by the predominant laryngeal complaints.



A, productive tuberculosis of both upper lobes; *B*, exudative tuberculosis of left lung; *C*, miliary tuberculosis of both lungs.

It will be noted in table 2 that only 1 patient had miliary tuberculosis. This seemed rather surprising because one would infer from the literature that a primary laryngeal symptom was almost exclusively a manifestation of a miliary type of disease. Of 55 cases of hematogenous tuberculosis reported by Cohen [5] 23 presented the initial symptom referred to the larynx. The one patient in our group, a man aged 62, sought the advice of his physician because of a sore throat. After a period of three months of local therapy a far advanced miliary lesion as shown at *C* in the illustration was discovered. The laryngeal examination revealed extensive ulceration of the epiglottis, both arytenoid areas and aryepiglottic folds. The patient died two months after the diagnosis of his pulmonary lesion was made, or five months after his initial symptom of sore throat.

Table 3 is an analysis of the lesions from the point of view of the major divisions of the larynx. The

3. Ornsteen, G. G., and Ulmar, David, in Goldberg, Benjamin: Clinical Tuberculosis, Philadelphia, F. A. Davis Company, 1935, vol. 1, p. B-61.

4. Ornsteen, G. G.; Ulmar, David, and Dittler, E. L.: A Clinical Classification of Pulmonary Tuberculosis, Am. Rev. Tuberc. **23**: 248 (March) 1931.

5. Cohen, A. G.: Hematogenous Tuberculosis with Involvement of the Larynx, Am. Rev. Tuberc. **41**: 426-443 (April) 1940.

intrinsic lesions comprise the vocal cords, ventricular bands and interarytenoid space. The extrinsic include the arytenoid areas, the aryepiglottic folds and the epiglottis. For purposes of a simpler classification, several patients showing a combination of lesions were arbitrarily placed in one group or the other, depending on the location of the predominant lesion. Of the 26 patients 15 had intrinsic lesions and 11 had extrinsic lesions. In the exudative group there were twice as many intrinsic lesions (6) as extrinsic (3), while in the productive group the location of the laryngeal lesions was about equally divided. In the fatal group there was a slight increase of extrinsic lesions (11) over the intrinsic (8), while in the apparently cured group the lesions were all confined to the interior of the larynx. Of the 9 original patients with exudative lesions 5 are apparently cured and have healed larynges, while of the 16 patients with productive lesions only

TABLE 3.—*Site of Laryngeal Lesion and Type of Pulmonary Disease*

	Pulmonary Lesion			
Laryngeal Lesion	Exudative	Productive	Miliary	Total
Intrinsic	6	9	0	15
Extrinsic	3	7	1	11
Total	9	16	1	26
Fatal Cases				
Intrinsic	1	7	0	8
Extrinsic	3	7	1	11
Total	4	14	1	19
Apparently Cured				
Intrinsic	5	2	0	7
Extrinsic	0	0	0	0
Total	5	2	0	7

TABLE 4.—*Predominating Laryngeal Lesion*

Lesion	Apparently Cured	Fatal
Infiltration	5	7
Ulceration	0	7
Edema	0	5
Tuberculoma	2	0
Total	7	19

2 are found in the apparently cured group. In other words, of the 7 apparently cured patients 7 had intrinsic lesions and 5 had an exudative type of pulmonary disease. These figures corroborate the belief that the prognosis is definitely better when only the interior of the larynx is involved, and as far as our investigations show in this selected group of cases the exudative type of pulmonary involvement is the more amenable to cure.

A brief summary of the pathologic findings in the larynx is presented in table 4 showing the usual predominance of infiltrative lesions. In this group, as in any other, the presence of ulceration or edema is frequently a sign of ill omen, while the finding of a tuberculoma—a local manifestation of fibrosis—is usually significant of a favorable prognosis.

SUMMARY AND CONCLUSIONS

1. Pulmonary tuberculosis should always be in the mind of the physician when a patient complains of chronic hoarseness or sore throat. A critical analysis of 26 cases shows that the laryngeal symptoms were the initial manifestation of pulmonary disease.

2. The chief misleading factor in the diagnosis is the apparent well being of the patients, whose latent pulmonary and systemic signs were masked by laryngeal symptoms.

3. Unfortunately, it appears that laryngitis is not a sign of early tuberculosis, since several of my cases showed moderately and far advanced pulmonary lesions five, six and seven weeks after the initial onset of laryngeal symptoms.

4. In cases of pulmonary tuberculosis complicated by laryngeal involvement, the clinician may find guidance in his treatment and prognosis if he is familiar with the location and type of the laryngeal lesion.

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ABSTRACT OF DISCUSSION

DR. FREDERICK T. HILL, Waterville, Maine: Dr. Donnelly's paper is timely because of the present tendency to overlook the laryngeal manifestations of tuberculosis. This is probably due to the decreased incidence of laryngeal manifestations of tuberculosis as a result of the effect of collapse therapy and more intensive methods of treatment. But what should not be condoned is the fact that it is looked for less often and less expertly. For some twenty-odd years I have been doing the consultative work at a state tuberculosis institution. In the early days every patient had a careful laryngeal examination. In the past few years that has not been asked for. On the contrary, the work has been bronchoscopic in efforts to find the source of a persistently positive sputum in cases in which various forms of collapse therapy have been employed. Now we know that the larynx may often furnish the clue to a diagnosis of tuberculosis which otherwise would be missed. I could cite experience with a number of private patients, similar to Dr. Donnelly's. A healthy man of about 60 was referred to me because of persistent sore throat of four months' duration. Examination showed an ulcerative area to the aryepiglottic fold, which might well be either tuberculosis or cancer. X-ray examination of his chest showed a well defined tuberculous process, and biopsy confirmed the diagnosis. I could repeat this experience many times. We must remember that tuberculosis is an insidious disease and oftentimes the larynx may show us the importance of chest x-ray examination. It is unfortunate that so many of these laryngeal cases are seen late, when ulceration or edema exists because of the poor prognosis. I agree with Dr. Donnelly that the productive type is a much more insidious and more difficult one to handle. The most important statement in the paper is the suggestion of the need of more careful routine laryngeal examination, something that is too often neglected. Every larynx should be carefully examined, with use of a local anesthetic for a gagging patient.

DR. JOSEPH I. KEMLER, Baltimore: It has been conceded that primary tuberculosis of the larynx is practically nonexistent, yet Osler stated that there are cases in which the lesion begins in the larynx or precedes the pulmonary lesion. I had a case many years ago with quite an infiltration of the larynx but with negative findings in the chest. I took out the infiltration on account of hoarseness, because I thought it was not tuberculous. On examination it was found to be a tuberculoma. The lesion had recurred. It was cauterized, and the patient got well. Ten years later the man had hemorrhages and cavitation and died of his tuberculous disease. A nurse was having a low grade fever daily. She was going downhill without any cause being found. Laryngeal examination revealed an infiltration on both cords, typical of tuberculosis. The sputum was at all times negative. The larynx was cauterized until the lesion cleared up, and the girl made an uneventful recovery. There was never enough infiltration to obtain biopsy. Therefore one could not tell exactly the nature of the lesion. But the treatment and the course ran true to form of tuberculosis of the larynx, in spite of the fact that her lungs were absolutely clear.

DR. JOSEPH C. DONNELLY, Philadelphia: Time does not permit a discussion of the contention that tuberculosis may occur primarily in the larynx. Suffice it to say that most authorities agree that the laryngeal involvement is always secondary. The primary focus can be revealed only by the finer diagnostic methods, which were unavailable in the time of Osler. Dr. Hill emphasized the need of a more careful routine laryngeal examination of all our patients. This is particularly true for those complaining of a sore throat. Before contemplating tonsillectomy a thorough examination of the larynx should be made.

CONSERVATIVE TREATMENT OF INVERSION OF THE UTERUS

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It has often been said that inversion of the uterus is an extremely rare obstetric complication. However, it is difficult to estimate accurately the true incidence of inversion because of the discrepancy between figures from the older literature and those of recent years. Most early reports cite an incidence of one inversion to several hundred thousand deliveries,[1] while more recently the reported incidence in various clinics has ranged from a high of 1:740 to a low of 1:16,000.[2] Apparently, then, inversion of the uterus occurs with sufficient frequency to make it likely that any one doing obstetric practice will encounter an occasional case. But, as with other rare disorders, accepted standard methods of treatment have not been generally agreed on. This leads to the use of a variety of therapeutic measures of doubtful value and tends to keep the mortality rates at unnecessarily high levels. A glance at the unfavorable mortality rates for inversion (10 to 43 per cent) reported in recent years [3] suggests that certain changes in the therapeutic procedures commonly employed might be beneficial.

It is our purpose to point out that the treatment advised in current obstetric textbooks, and indeed in most of the periodical literature, is not necessarily the treatment of choice. Apparently the work on which present conclusions are drawn is almost entirely from the older literature, whereas more recently the approach to the problem has been entirely changed by such factors as (1) recognition of the part that shock plays in the primary mortality from inversion, (2) the effects of immediately available blood for transfusion, (3) methods for the control of infection and (4) improved technics for vaginal surgery. Strangely enough, the obstetricians and the gynecologists have approached inversion from two different points of view, that is, the acute as against the chronic form of the disorder, and have not thought of the desirability of combining their experiences. Results in the chronic form by and large have been satisfactory, whereas quite the opposite is true of the acute variety of inversion following delivery.

To be more specific, Williams [4] (Stander's revision), De Lee,[5] Beck,[6] Titus [7] and Irving,[8] as well as others,[9] are unanimous in recommending immediate replacement of the inverted uterus and the use of deep surgical anesthesia for this purpose if necessary. While it is true that most of these writers have mentioned the necessity of combating shock as a preliminary or simultaneous measure, certainly the emphasis has been on the maneuvers by which the uterus may be replaced. And the desirability of replacing the uterus at the earliest possible opportunity—that is, as soon as the patient shows evidence of rallying from the initial shock—has been stressed repeatedly.

On the other hand, at least two others, Barrows [10] and particularly Brett,[11] have already pointed out that immediate replacement of the inverted uterus is a dangerous and unnecessary procedure, that active shock therapy is all important, and that the inversion per se may be dealt with at any suitable time after the patient is restored to normal health and after the lower genital tract has been adequately prepared for surgery—preferably a number of weeks (four to twelve have been advised) after the acute episode. Our recent experiences again have demonstrated the soundness of these principles in the management of inversion. Since this conservative approach to the problem apparently has not met with acceptance, it seems worth while to restate the details of such a therapeutic program and to demonstrate the type of result which may be obtained with it.

Conservative treatment of inversion embodies the following general and specific measures:

1. No procedure which will tend to increase the shock should be employed at the time of occurrence or discovery of acute inversion. Deep surgical anesthesia and forceful attempts at replacement are contraindicated. Vasoconstrictor agents, such as epinephrine, are likely to do more harm than good, since arteriolar tone already is high in the shocked individual.

2. Immediate attention should be focused on the general reaction of the patient. Shock must be anticipated even if not already evident.

3. The inverted uterus may be left entirely alone, unless the extent of the bleeding from it is such as to require the application of a tight vaginal pack or other procedure for the immediate control of hemorrhage. Whatever is done in this regard must not be such as to add to the shock.

4. For the patient who is clearly not in shock and for whom blood has been made available, it may be permissible to undertake a single minor attempt at manual replacement of the uterus, but by and large the attention will have to be directed elsewhere.

5. Multiple blood transfusions (in terms of 500 cc. units) are required to combat shock in the average case, particularly if the inversion has gone unrecognized

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1. Wadstein, Torsten: Puerperal Uterus Inversion, Acta obst. et gynec. Scandinav. **17:** 24-35, 1937. Phaneuf, L. E.: Inversion of the Uterus: A Report of Five Personal Cases, Surg., Gynec. & Obst. **71:** 106-109 (July) 1940.

2. Davis, G. H.: Acute Inversion of the Uterus, with a Report of Four Cases, Am. J. Obst. & Gynec. **26:** 249-254 (Aug.) 1933. Wadstein.[1] Irving.[8] Brett.[11] Cosgrove.[12]

3. Harer, W. B., and Sharkey, J. A.: Acute Inversion of the Puerperal Uterus. A Record of Twenty-One Cases, J. A. M. A. **114:** 2289-2292 (June 8) 1940. Wadstein.[1] Phaneuf.[1] Irving.[8]

4. Stander, H. J.: Williams Obstetrics, ed. 8, New York, D. Appleton-Century Company, 1941.

5. De Lee, J. B.: The Principles and Practice of Obstetrics, ed. 7, Philadelphia, W. B. Saunders Company, 1938.

6. Beck, A. C.: Obstetrical Practice, ed. 2, Baltimore, Williams & Wilkins Company, 1939.

7. Titus, Paul: The Management of Obstetric Difficulties, ed. 2, St. Louis, C. V. Mosby Company, 1940.

8. Irving, F. C.: Inversion of the Uterus, in Curtis, A. H.: Obstetrics and Gynecology, Philadelphia, W. B. Saunders Company, 1933, vol. 3, chapter 92.

9. Rucker, M. P.: Puerperal Inversion of the Uterus, South. M. J. **32:** 197-202 (Feb.) 1939. Wadstein.[1] Phaneuf.[1] Davis.[2] Cosgrove.[12] Harer and Sharkey.[3]

10. Barrows, D. N.: The Treatment of Recent Puerperal Inversion of the Uterus, with a Report of Five Cases, Am. J. Obst. & Gynec. **27:** 105-108 (Jan.) 1934.

11. Brett, P. G.: Inversion of the Uterus Following Childbirth, M. J. Australia **1:** 254-256 (Feb. 5) 1938.

until such time as a combination of shock and hemorrhage has brought the patient to a precarious state. When blood is not immediately available, plasma or serum are excellent temporary substitutes and ought to be made available in all institutions handling obstetric cases. After recovery from shock, further blood transfusions may be required to hasten the restoration of normal hemoglobin levels. Particular care must be taken, of course, to avoid isoimmunization reactions associated with the blood factor Rh.[12]

6. The placenta probably should be left in situ, if possible, for twenty-four to forty-eight hours in the interest of lessened hemorrhage, although there is evidence in the literature[13] to suggest that the removal or retention of the placenta is a matter of no particular consequence. Often, of course, the placenta has already been delivered when the inversion occurs or when it is recognized.

7. Systemic chemotherapy with sulfonamide compounds (sulfathiazole, sulfadiazine) should be instituted at once as prophylaxis against both local and generalized infection.

8. Local infection may be reduced to a minimum by repeated (daily) application of antiseptic vaginal packing. For this purpose gauze rolls saturated with an emulsion of acriflavine are recommended, although other similar agents seem to be equally effective[10] and at the same time presumably nonirritating to the uterine or vaginal mucosa.

9. After four to six weeks of observation in the hospital and continuance of the protective measures (chemotherapy and vaginal antisepsis) the now well involuted uterus may be restored surgically to its normal position or may be removed. Plastic procedures directed at replacement and functional restoration of the organ may be undertaken by either the abdominal or the vaginal route. The exact time may be controlled by endometrial biopsy or by the disappearance of gross evidence of infection and evidence of satisfactory involution. When the patient's child bearing is complete or when sterilization is desirable for other reasons, the procedure of choice is vaginal hysterectomy under local anesthesia.

10. There is evidence that an occasional inverted uterus, during the period of preparation for surgical replacement or removal, will undergo spontaneous reinversion[14] and no operative procedure then will be necessary.

To illustrate the efficacy of conservative management, the following 3 cases treated recently in the gynecology service of the University of Minnesota Hospitals are cited:

REPORT OF CASES

CASE 1.—A primipara aged 31 was delivered elsewhere by low forceps extraction over a midlateral episiotomy of a normal infant weighing 3,810 Gm. after a labor of twelve hours. During the repair of the episiotomy the placenta was removed by a combination of vigorous pressure on the uterine fundus as well as considerable traction on the cord in order to control excessive bleeding. The vagina was packed loosely with a small quantity of gauze and the perineal repair was completed. Shortly thereafter the patient was observed to be in shock, and this was dealt with over a period of six hours by the use of epinephrine, intravenous fluids and blood transfusions. Three subsequent blood transfusions were given over the next several days. Despite lack of healing of the episiotomy wound the patient was able to leave the hospital on the eleventh postpartum day. At that time a tentative diagnosis of right broad ligament hemorrhage was made to explain the postpartum shock. This was suggested by rigidity and fulness in the right lower quadrant of the abdomen, and it was noted also that the uterus was not palpable abdominally during the immediate puerperium. Two weeks later a secondary closure of the episiotomy was attempted as an office procedure, but this was unsuccessful. At a second office visit, one month post partum, an inversion of the uterus was discovered but no therapy was undertaken at once. During the next two weeks considerable uterine bleeding occurred, sufficient to require hospitalization for blood transfusion; at that time an attempt was made to replace the uterus manually under anesthesia. This was unsuccessful, but the opportunity was taken to attempt again to repair the episiotomy area. Immediately after this procedure the patient again went into shock, which was treated with multiple blood transfusions and artificial respiration. On recovery from this episode she was referred to the University of Minnesota Hospitals for consideration of surgical correction of the inversion. She was now nearly eleven weeks post partum.

Pelvic examination disclosed a dome shaped mass about 5 cm. in diameter in the upper vagina, protruding through a partially dilated cervix. The mass was smooth, glistening and bright red and did not bleed on mild trauma. No uterine corpus was palpable above the vagina; the lateral pelvic areas were normal to palpation. The perineum had healed fairly well by second intention. Bacteriologic culture of material from the endometrial surface of the inverted uterus revealed a coagulase positive staphylococcus, gamma streptococcus and Escherichia coli. The vagina was treated by daily insertions of gauze packing soaked in acriflavine emulsion, and sulfathiazole was given orally both preoperatively and postoperatively. An endometrial biopsy showed a nonfunctioning endometrium with vascular congestion in the stroma and little or no evidence of inflammation. On June 17, 1941, twelve weeks post partum, the inversion was corrected by the intra-abdominal route, with anterior incision of the cervix and lower uterine segment. A small area of serosal and muscular necrosis at the apex of the fundus was excised. The postoperative course was uneventful and the patient left the hospital thirteen days after operation. She was instructed to return in two months for endometrial biopsy and uterosalpingography but failed to do so. Her home physician reports that menstruation recurred one month after the uterine plastic operation and has been fairly regular for eleven months; the flow lasts only three instead of the usual four to five days and is scanty.

CASE 2.—An octipara aged 37 induced an abortion on herself by means of a catheter early in the fourth month of her twelfth pregnancy. After somewhat more than two days of excessive bleeding a physician was called to see the patient at home. While he was expressing the retained placenta by suprapubic pressure an inversion of the uterus occurred. The patient was transferred by ambulance to the University of Minnesota Hospitals, a distance of 90 miles, where she arrived three hours after delivery. On admission she was comatose and moribund. Gasping respirations occurred at the rate of four to five per minute, blood pressure and radial pulse were unobtainable, cardiac sounds were barely audible and the heart rate was about 140 per minute. Immediate therapy for shock was instituted. With the patient in steep Trendelenburg posture, intravenous isotonic solution of sodium chloride was started, plasma was quickly added, and blood was given as soon as cross matching tests had been read. After 200 cc. of plasma, 1,500 cc. of blood and 1,000 cc. of isotonic solution of sodium chloride had been administered, her blood pressure was 90 systolic and 60 diastolic mm. of mercury and she had regained consciousness. Physical examination revealed nothing of consequence other than the inverted uterus within the vagina. The latter was packed with gauze saturated with acriflavine emulsion and the packing subsequently was changed daily. In addition, over a period of three weeks, sulfadiazine was given by mouth; blood levels of sulfadiazine, determined daily, ranged from 8 to 15 mg. per hundred cubic centimeters. Initial cultures from the uterus showed a coagulase positive staphylococcus, gamma streptococcus and E. coli, but two weeks later

12. Levine, Philip; Katzin, E. M., and Burnham, Lyman: Isoimmunization in Pregnancy: Its Possible Bearing on the Etiology of Erythroblastosis Foetalis, J. A. M. A. **116**: 825-827 (March 1) 1941.

13. Cosgrove, S. A.: Management of Acute Puerperal Inversion of the Uterus, Am. J. Obst. & Gynec. **38**: 912-925 (Nov.) 1939.

14. Brett,[11] Barrows.[10]

only a coagulase negative staphylococcus was found and the uterus was well involuted and clean. Several further blood transfusions were given and the hemoglobin rose from 5 Gm. (sample taken at end of initial shock therapy) to 12.25 Gm. per hundred cubic centimeters. On the twenty-second hospital day a vaginal hysterectomy, as well as repair of cystocele, rectocele and pelvic floor, was done. Microscopic examination of several areas from the wall of the removed uterus showed a very thin but complete surface epithelium, a few basal glands, hemorrhagic areas and round cell infiltration throughout the stroma, pronounced increase in fibrous constituents of the stroma, and some round cell infiltration in the myometrium. The immediate postoperative course was uneventful and the patient left the hospital on the eighteenth postoperative day. She returned two months later with a complaint of pain in the left pelvis and left thigh, which presumably was attributable to intrapelvic thrombophlebitis. This was relieved by anesthetization of the lumbar sympathetic ganglions and at the present time she is well and free from symptoms.

CASE 3.—A secundipara aged 26 was admitted elsewhere in early labor three days after the expected date of confinement for her third pregnancy. After eleven hours of ineffectual uterine contractions a half minim of solution of posterior pituitary was administered intramuscularly. An hour later a premature infant weighing 2,333 Gm. was delivered spontaneously from the left occipitoanterior position over a midlateral episiotomy. Repair of the episiotomy was done under nitrous oxide anesthesia. During this procedure 1 cc. of solution of posterior pituitary was given to control alarming uterine bleeding and five minutes later the placenta was delivered by strong fundal pressure. Intramuscular ergonovine was given after the third stage of labor, and the uterus was massaged to firmness. Considerable uterine bleeding persisted, despite repetition of the ergonovine. One and one-half hours later the patient was in shock—cold, moist, pulse almost imperceptible, air hunger, and blood pressure unobtainable. During the next hour she rallied somewhat under the influence of respiratory stimulants, intravenous dextrose in saline solution and intravenous ergonovine. After a blood transfusion was under way a sterile vaginal examination was performed by a consultant, who had noted absence of the fundus in the lower abdomen, and inversion of the uterus was discovered. The vagina was tightly packed with gauze and an additional thousand cubic centimeters of blood was given. A regimen of daily antiseptic vaginal packing, additional blood transfusions and oral sulfadiazine was carried out during the postpartum hospital stay of thirteen days. The temperature rose as high as 104.6 F. on the third postpartum day, subsided slowly and was essentially normal after the seventh day. The hemoglobin rose from 3.6 Gm. on the first postpartum day to 10 Gm. at the time of discharge.

Although the patient was instructed to present herself at once at the Gynecology Clinic of the University of Minnesota Hospitals, she failed to do so and was not admitted until nine weeks after the delivery. She came at that time because of a pronounced increase in vaginal bleeding, which had been intermittent since delivery. The hemoglobin had dropped to 6.0 Gm. Endometrial biopsy showed a low degree of endometritis in a nonfunctioning endometrium, and culture of material from the endometrial surface showed Streptococcus viridans. The vagina and uterus were treated with gauze packs soaked in an acriflavine emulsion, but the trauma associated with this procedure seemed to aggravate the bleeding, so that eventually only the emulsion was used as an instillation. Bleeding from the inverted endometrial surface continued for several days, the hemoglobin dropping as low as 4.45 Gm. on the third hospital day. After seven blood transfusions given over a period of five days the hemoglobin was 8.0 Gm., uterine bleeding was minimal and it was decided to carry out vaginal hysterectomy before further serious hemorrhage ensued. This was done under local anesthesia on the eighth hospital day. The postoperative course was uneventful and the patient left the hospital two weeks after the operation. Two months later examination showed an excellent surgical result. Microscopic section of the wall of the uterus showed the endometrial surface epithelium to be missing in many places; a few glands showed no proliferative activity. There was considerable hemorrhage in the superficial portion of the stroma, an unusually cellular stroma with swollen cells, congestion of small vessels, and a mild lymphocytic infiltration. The myometrium appeared normal.

Contrast with these 3 cases the following 1, with fatal outcome, which was brought to our attention recently during the course of a study of maternal mortality in Minnesota:

CASE 4.—A primigravida aged 22 had an uneventful pregnancy and went into spontaneous labor four days prior to her expected date of confinement. After one-half hour in the second stage of labor she was prepared for delivery, midlateral episiotomy was performed, and low forceps extraction of a normal term size infant was done easily under drip ether anesthesia. The episiotomy was repaired in the usual manner and no abnormal bleeding occurred during this procedure. At the completion of the repair the uterine fundus could not be located by abdominal palpation, but the significance of this was not immediately appreciated. The placenta at this time was said to have been just within the introitus and was very easily lifted out by gentle traction on the cord. Abdominal palpation again failed to reveal the presence of the fundus and considerable bleeding appeared at the introitus. Separation of the labia then demonstrated the presence of an inverted uterus. The physician at once attempted to replace the uterus manually. This maneuver, which was unsuccessful, was persisted in for approximately fifteen minutes, during which time the patient lost an estimated liter of blood and went into severe shock. Intravenous 5 per cent dextrose in isotonic solution of sodium chloride was started and 1,000 cc. administered. Accurate blood pressure and pulse rate determinations were not recorded, but the pulse was described as being "very weak." Two hours post partum the patient was returned to her room and further supportive therapy consisting of the Trendelenburg position, heat and intravenous fluids (2,000 cc. of dextrose in saline solution and finally 250 cc. of plasma) was carried out. No transfusions of whole blood were given, apparently because no facilities for blood grouping or cross matching were available in the institution concerned. The patient did not recover from the shock, and death occurred about three hours post partum. Permission for autopsy was not requested. However, the birth canal was examined post mortem and no abnormalities other than the inverted uterus were found.

COMMENT

It is obvious that the management of the 3 patients who recovered was not in all respects ideal. This was due in large part to lack of immediate recognition of the disorder by the attending physicians and lack of a definite program for the treatment of inversion. In case 3, of course, much unnecessary delay in treatment and the added complication of secondary hemorrhage may be attributed to poor cooperation on the part of the patient. Despite these deficiencies in management, the end results were all that could be desired.

In view of these experiences, then, and those of others advocating conservative treatment of inversion, it would seem wise to recommend a reconsideration of the problem of immediate therapy. The high mortality attending this condition may be largely attributed to hemorrhage and shock, and most of the fatalities occur within a few hours after the occurrence of the inversion. Attempts at immediate replacement are well known to increase both shock and hemorrhage. Attempts at replacement later, but in the course of the first few days, either have been largely unsuccessful or have involved surgical manipulations which have unnecessarily increased the danger of spread of infection. We have demonstrated to our own satisfaction that the patient with uterine inversion can at least to a very large extent be protected from the results of shock, hemorrhage and infection. Following recovery, time

may be safely allowed for uterine involution to occur. Correction of the condition may then be carried out at a controlled, elective time when the dangers involved appear to be not greater than those of elective gynecologic surgery.

Early recognition of the condition, rapid and efficient treatment of shock and blood loss, avoidance of any uterine manipulation and protection from infection, with postponement of corrective surgery, may be expected to reduce significantly the present serious mortality of inversion of the uterus.

SUMMARY AND CONCLUSIONS

Inversion of the uterus apparently occurs more often than suggested by the usual figures for incidence quoted in obstetric textbooks.

Mortality rates associated with inversion have been and still are excessively high. This would suggest that commonly employed therapeutic measures are in need of revision.

In recent years much improvement in end results has been demonstrated to follow the use of conservative management. This consists of (1) vigorous antishock treatment, (2) disregard for the inverted uterus itself in the acute stage, other than adequate control of bleeding and infection, and (3) surgical correction of the abnormal uterus some weeks later, after thorough presurgical preparation of the lower genital tract.

Three case histories show the favorable type of result obtained with conservative therapy, with either retention or removal of the uterus, and a fourth case history demonstrates the dangers encountered when the shock associated with inversion is neglected.

ABSTRACT OF DISCUSSION

Dr. W. Benson Harer, Philadelphia: I am in complete accord with the idea of Drs. McLennan and McKelvey as to the need for measures to combat shock, hemorrhage and infection. Our difference of opinion hinges entirely on the question of time and methods of replacement of the inverted uterus. For convenience, as to the time of replacement of the uterus, I would divide these cases into three classes: immediate, intermediate and delayed. I have found in 12 cases that immediate replacement readily accomplished the inversion without increasing the shock and with immediate improvement in the general condition of all the patients. By intermediate replacement I refer to attempts at replacement after the cervix has contracted down and while the patient is deep in shock and generally has lost excessive amounts of blood. Here I believe no effort at replacement should be made. By delayed replacement I mean attempts at replacement of the uterus after the patient has recovered from the initial shock. Here again I am in complete accord with the authors. There is no need for hurry. One should take sufficient time to place the patient in the best possible condition to withstand the necessarily extensive surgical procedures required for replacement or removal of the inverted uterus. In 1940 Dr. John Sharkey and I analyzed all the cases of acute inversion of the uterus occurring in Philadelphia in a period of six years. We then had 21 cases. Since that time we have added 4 more cases, making a total of 25. Of these, 12 were personally treated. This is still not enough to warrant drawing definite conclusions, but for so rare a condition, the number is sufficient to be suggestive or possibly fairly conclusive. Analysis of the cases presented by Drs. McLennan and McKelvey shows that there was no opportunity to attempt immediate replacement of the inverted uterus. Hence these cases afford no evidence as to the value of immediate replacement. Of the 25 cases 15 were treated by immediate manual replacement of the uterus. All 15 were readily replaced, with immediate pronounced improvement in the general condition. Thirteen of these patients subsequently recovered and 2 died. Five were treated by intermediate manual replacement. All 5 patients died. In these 25 cases, therefore, immediate manual replacement of the inverted uterus gave by far the best results.

Dr. W. A. Coventry, Duluth, Minn.: The rarity of inversion of the uterus makes it evident that such an incident probably will never occur in the practice of the average busy obstetrician, but none the less he should be keenly aware of such an accident. From the remarks of the authors and a review of available literature, there are several lessons to be learned. The endometrial biopsies are of scientific value, tending to show the tendency of the endometrium to assume the character of its new host. The bacteriologic investigations are of less value, since similar types can be found also in the vagina and cervix of noninverted uteri. The practical value of these observations must be recognized. The forceful extraction of the placenta by vigorous down pressure on the fundus of the uterus coupled with undue pulling on the umbilical cord, whether at full term or at any other period of gestation, is not good obstetric practice. This practice is becoming more noticeable among the interns coming to our hospitals. The serious dangers of such a procedure should be stressed by teachers in medical schools. The incident of shock in the third stage of labor is always a reminder of inversion of the uterus. The severity of this incident is undoubtedly due to severe hemorrhage coupled with the disturbed circulation in the inverted uterus. The shock is always severe and requires most vigorous treatment by all the methods stressed in the paper. The manual replacement of the uterus by vaginal or abdominal methods should not be undertaken during the period of shock but reserved until the shock is under control. The precautionary use of the sulfonamide drugs is to be commended. Four to six weeks is too long a period to wait before attempting reposition. Do we want complete involution of the uterus before replacement is attempted? The lateness of the period in which these cases reported came under the observation of the authors necessitated such operative procedures as noted in their case reports. It would appear to me that the loss of the uterus is too great a penalty to pay in cases of inversion of the uterus and that there should be a safe period after overcoming the shock incident when reposition of the uterus could be done with due respect to the safety of the patient.

Dr. Louis E. Phaneuf, Boston: I have been interested in inversion of the uterus for the last twenty years. The literature during this period has led me to the belief that the incidence reported is too low. Inversion of the uterus is a more common lesion than we are led to believe. The reason for this is obvious, as a number of observers who might have had but 1 case have never reported them. The accumulation of these isolated instances would considerably raise the incidence. Another factor which has impressed me has been the decided lowering of the mortality during the last two decades. The three main causes of death have been shock, hemorrhage and sepsis. These have been overcome by the methods outlined in the paper, namely blood transfusions, chemotherapy and antiseptic vaginal applications. In my mind, blood transfusions have played the most important role. I have treated 6 women with inversion of the uterus. The placenta of 1 patient was removed immediately after the accident occurred and the uterus was reinverted manually, a very simple procedure in my hands followed by immediate improvement. Three patients had anterior colpohysterotomy. The fifth patient had an abdominal panhysterectomy and the sixth a vaginal hysterectomy. Of the 4 patients whose uteri were conserved, 1 subsequently became pregnant. She had had a Spinelli operation and became pregnant about two years later. At eight and a half months of this gestation she spontaneously ruptured the uterus while in her bed at her home. She was delivered by cesarean hysterectomy, with recovery of mother and baby. The danger of rupture of the uterus must be borne in mind in subsequent pregnancy when one is performing the Spinelli operation or any other type of conservative operation for inversion of the uterus.

Dr. John Huberman, Newark, N. J.: According to a report from the Maternal Welfare Committee of the Massachusetts Medical Society, April 16, 1942, cases of chronic inversion of the uterus are extremely rare, since most patients with uteri that become inverted and are not replaced die of hemorrhage. Vaginal hysterectomy has been the method usually performed

in these cases of chronic inversion, owing to the fact that the uterine body is edematous and chronically infected. However, with the use of sulfanilamide by local application into the peritoneal cavity, the chances of infection have been minimized. In my case it was deemed safe to perform a Spinelli operation, as I felt that we were dealing with a 22 year old patient, when a conservative operation is preferable. Five Gm. of sulfanilamide was inserted into the peritoneal cavity and the uterus was replaced in a normal anatomic position. She was discharged on the fourteenth postoperative day and had a normal menstrual period on the twenty-fifth postoperative day.

DR. CHARLES E. MCLENNAN, Minneapolis: In reply to Dr. Harer's implication that he prefers immediate replacement I would say that I agree with him when circumstances are such that replacement can easily be done by one conversant with the technics. I merely wanted to suggest that in average hands and under ordinary circumstances when there has been some delay in diagnosis the conservative management appears to give much better results. To Dr. Coventry, who mentioned the high price of the loss of the uterus, I would like to point out that we do not recommend vaginal hysterectomy except for those women who are through with their childbearing period or in whom for some other reason sterilization is desirable. I wish to thank Dr. Phaneuf for pointing out the danger of uterine rupture in those uteri which are reconstructed and left in situ.

SOME PHYSIOLOGIC ASPECTS OF THE USE OF SEA WATER TO RELIEVE DEHYDRATION

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NEW ORLEANS

Modern warfare creates a situation whereby frequently small numbers and less frequently large numbers of naval, military or civilian personnel are suddenly cast on the seas to survive as best they can in small life craft. World War I saw submarine warfare initiated on a major scale for the first time. The present war, however, sees submarine activities and mine laying, together with the proved additional deadly instrument of aerial attack, all conducted simultaneously on the seven seas on a scale hitherto unknown.

Survival at sea after forced abandonment of a ship in an intact standard lifeboat is contingent on two major factors: (*a*) timely rescue or (*b*) the ability to make land. The first factor is self explanatory. The second is controlled by several subfactors: (*a*) ability to combat exposure and exhaustion, (*b*) the meteorological conditions such as weather, tide, currents and wind, (*c*) availability of motive power: (1) mechanical (engine and sail), (2) man power, and (*d*) availability of food and water. The factors that can be controlled or influenced beforehand are availability of motive power and availability of food and water. Bulk and weight can quickly impose definite limitations on those two factors.

Dr. D. W. Williams, New Orleans, extended his cooperation.
Released for publication by the War Department Manuscript Board, which assumes no responsibility, other than censorship, for the contents of this article.
Major Everhart, of the Department of Pediatrics, and Lieutenant McCord, associate professor of biochemistry, Louisiana State University School of Medicine, are on extended leave for army duty.

The time during which man can be deprived of water intake is vastly shorter than that over which he can be deprived of food and maintain life. The old rough general rule three minutes without air, three days without water or thirty days without food applies. If the chances for survival can be widened from the water deprivation limit of three days to the food deprivation limit of thirty days, then indeed is there a tremendous increase of survival odds. There has been more than one instance lately in which men have exceeded the astounding survival epic of Nordhoff and Hall of "Men Against the Sea." The question has been raised intermittently and with increasing frequency lately as to whether sea water can be used in any way whatever to satisfy the minimum water needs of the body.

PROBLEM OF MAKING SEA WATER POTABLE

What means can be found to solve the problem of making sea water potable under the conditions stated? There are three approaches to this question:

1. *Chemical.*—Sodium chloride constitutes almost 80 per cent of the salts present in sea water. The possibility of precipitating the chloride by use of silver or some similar salts is intriguing. However, a precipitation of this type would merely substitute another radical for the chloride ion and would not reduce the salt concentration or osmotic pressure of the sea water. The use of some type of colloidal reaction in which the sodium chloride could be selectively adsorbed has possibilities. However, at present no such substance is available.

2. *Mechanical.*—Actual distillation of sea water is, of course, a well established method. However, the bulk and weight involved in such apparatus, together with the furnishing of the required source of heat energy under all conditions, has thus far precluded any satisfactory solution from this angle.

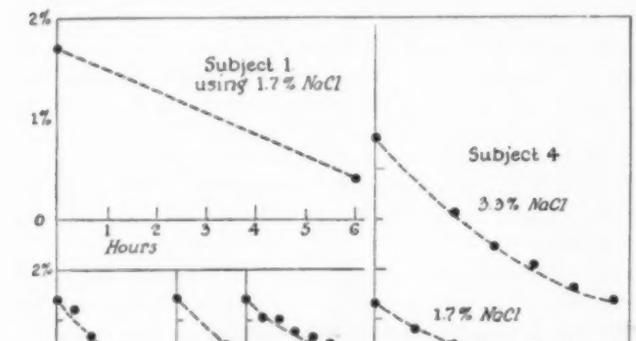
3. *Physiologic.*—The physiologic approach involves the use of sea water in some manner that results in a selective absorption of the water without an accompanying absorption of salt. This would involve the concentration of a solution already hypertonic to the blood. Such a concentration would then violate the present accepted principles of osmosis. However, certain tissues of the body are able to concentrate fluids to some extent, and it is not entirely beyond the realms of possibility that sea water could be further concentrated, even though but slightly, by some living membrane.

Sea water is abundantly available under the stated conditions of disaster. It cannot be used orally because the salt present is absorbed and to some extent may act as a cathartic or emetic. However, precise physiologic proof is lacking with regard to the absorption or nonabsorption of sea water when taken by mouth. If 100 cc. of sea water of a sodium chloride concentration of 3 per cent is absorbed, it will produce an excretion of 150 cc. of urine of 2 per cent sodium chloride concentration, resulting in a net loss of 50 cc. of water. The concentrating power of the kidney is limited. The renal tubules cannot concentrate the glomerular filtrate beyond a sodium chloride concentration of about 2 per cent.[1] If the sea water was not absorbed, its higher osmotic pressure would result in drawing water into the lumen of the intestine, thereby also creating a net loss. It would be dangerous and not practical under

1. Goodman, Louis, and Gilman, Alfred: The Pharmacological Basis of Therapeutics, New York, Macmillan Company, 1941, p. 630.

ship disaster conditions to attempt subcutaneous or parenteral use, assuming that it was usable. Therefore the only other possible mode of intake might be by rectal instillation. Current theories of osmosis and absorption would indicate that the use of sea water by mouth or by rectum should not differ in its physiologic effect on water balance. However, the colon is known to have certain powers of absorption and excretion. Therefore we wished to prove experimentally whether or not sea water could be concentrated by the colon to make water available to the organism.

A search of the literature [2] indicates that little experimental work has been done. A word of mouth statement was made by a Mr. Graham [3] in 1916, who claimed to have taken 2 gallons of sea water by rectum daily for seven days while fasting and taking no other fluids. He claimed a beneficial result, being free from thirst and hunger at the end of the period, but published no data. Two British naval surgeons, Critchley and Allison,[4] conducted an experiment on 2 subjects. They instilled 10 ounces of sea water into the rectum



Results of tests.

three times at six hour intervals and noted no beneficial results. More recently an experiment was cited [5] concerning the use by rectal instillation in which negative results were obtained. Lieutenant Pittard [6] conducted experiments along similar lines and advocated the use of sea water by rectum to combat dehydration, stating that "sea water was less toxic when taken by rectum."

Our current interest in the overall problem raised in connection with the stocking and provisioning of lifeboats on army transports has led to the following study, which it is believed is more complete than any previously conducted.

PROCEDURE

From the practical standpoint several factors had to be considered; viz., ease of administration, optimum amounts for retention and possible local irritative effects. In addition, certain theoretical factors such as temperature, humidity, body surface area and water loss by perspiration and other routes could be considered. However, in this experiment the fine considerations of temperature and the like were disregarded until it could first be determined whether the method was actually feasible.

Three army medical officers volunteered as subjects to put the method to a test. In order to simulate conditions of exposure, an island in the Gulf of Mexico, near the mouth of the Mississippi River, was selected as the location for the experiment. The subjects exposed themselves to wind and weather on the shore of the island and reduced their water intake until the symptoms of water deprivation were becoming severe, as noted by subjective observations and by urine analyses. Thus dehydration was established before the experiment was started. Such a state is essential to accurate observation. Sea water for the experiment was obtained from a point 5 miles from the shore of the island and filtered before use. This sea water was somewhat diluted by river water. Its salt content (1.7 per cent sodium chloride) was approximately half that of open ocean water.[7] A comparison of the effects of this somewhat diluted sea water was to be made later with the effects of sea water of higher saline content. For this purpose a hospital patient was made available for the experiment. As the result of a complete stricture of the rectum associated with venereal lymphogranuloma, this patient had received a colostomy several weeks previously at about the midtransverse colon. At the time of operation the colon appeared normal. This patient was in a state of water balance.

METHODS

After a condition of water deprivation was established, filtered sea water was instilled through the rectum into the colon through a soft rubber catheter. Samples were removed at various intervals and analyzed for chloride content by the Schales [8] method. Urine specific gravities were measured by use of a clinical urinometer. The water in the diet was kept to a minimum by weighing the food and calculating the water content by the use of food charts. The sea water was analyzed for total solids, sodium, magnesium, calcium, carbonate, chloride and sulfate by standard laboratory methods.

With regard to the colostomy patient, 200 cc. of the diluted sea water was introduced into the completely divided distal portion of the colon. This obviated any complication involving loss of water or contamination

2. Gatewood, J. D.: Naval Hygiene, Philadelphia, P. Blakiston's Son & Co., 1909. Warbasse, J. P., and Smyth, C. M., Jr.: Surgical Treatment, Philadelphia, W. B. Saunders Company, vol. 3, p. 33, 1937. Secratan: Letter to British Medical Journal in January 1924. Can Sea Water Be Used to Quench Thirst? London letter, J. A. M. A. **117:** 1456 (Oct. 25) 1941.

3. Roberts, Morley: Brit. M. J. **1:** 220, 1918.

4. O. N. I. Report, Serial 2818 (Naval Attaché, London, England).

5. Sea Water Enemas, Queries and Minor Notes, J. A. M. A. **119:** 307 (May 16) 1942.

6. Pittard, Knox, Lieutenant (j. g.), M. C., U. S. Navy: Dehydration Combated with Sea Water, Contact, School of Aviation Medicine, U. S. Naval Air Station, Pensacola, Fla., Feb. 1, 1942.

7. It has been established that the salinity of ocean water varies in different parts of the world. Pending receipt of samples for analyses from various parts of the Caribbean area, no definite figures can be published for this reason. Wheeler's figures are on samples taken off the coast of the Carolinas:

Concentration of Salts in Parts per Hundred

Constituent	Ocean Water	Gulf Ocean Water as Used
Sodium	1.1049	0.5959
Potassium	0.0442	.....
Calcium	0.0433	0.0240
Magnesium	0.1353	0.1737
Chlorine	1.9909	0.8186
Sulfate	0.2754	0.0850
Carbonate	0.0123	0.0420

8. Schales, Otto, and Schales, Selma S.: A Simple and Accurate Method for the Determination of Chloride in Biological Fluids, J. Biol. Chem. **140:** 879 (Sept.) 1941.

by feces. This limited the absorption to this portion of the intestine. Two cc. samples were withdrawn every ten minutes for sodium chloride determinations. At the end of one hour the entire contents of the colon were removed and the volume measured. The experiment was repeated three days later, using an artificial sea water solution containing 3.3 per cent of sodium chloride.

RESULTS

SUBJECT 1.—The specific gravity of the urine before rectal instillations were commenced was 1.035. The blood nonprotein nitrogen was 40 mg. per hundred cubic centimeters. Six hundred cc. of sea water was introduced into the bowel through a soft rubber catheter. It was retained with difficulty, because of severe cramping, for six hours. At the end of this period 150 cc. of semisolid fecal material was recovered with a total chloride content of 0.6 Gm. (0.4 per cent). Two hundred and sixty cc. of urine with a specific gravity of 1.027 was passed at the end of the six hour period.

SUBJECT 2.—Six hundred cc. was instilled into the colon but because of severe cramping could not be retained.

The specific gravity of the urine of the same subject twelve hours later was 1.033 before instillations were commenced. The blood nonprotein nitrogen was 35 mg. per hundred cubic centimeters. Three hundred cc. of sea water was taken by rectum through a soft rubber tube. Samples of 5 cc. volume were taken every twenty minutes for two hours and analyzed for the chloride content. The results are indicated in the accompanying chart. The last sample was obtained with difficulty, as very little fluid remained in the bowel. One hundred and twenty cc. of urine was passed at the end of the period, with a specific gravity of 1.021.

SUBJECT 3.—The specific gravity of the urine before instillation of 600 cc. of sea water was 1.035. The blood nonprotein nitrogen was 34 mg. per hundred cubic centimeters. The water was retained one hour and then passed, owing to severe cramping. The volume was 650 cc., which included fecal material. This total sample at the end of the period contained 8.34 Gm. of sodium chloride, 1.28 per cent.

Twelve hours later, before instillation was started, the specific gravity of the urine was 1.038. Three hundred cc. of sea water was instilled. Samples were taken every twenty minutes. At the end of the period the specific gravity of the urine was 1.032. No residue could be recovered from the bowel at the end of the experimental period.

In none of the subjects was a diminution of thirst apparent after taking the sea water instillations. Headache, weakness, and fogging of mental processes seemed to progress as the experiment continued. Weight loss and anorexia increased. Blood pressure, pulse and temperature were unchanged. The experiment was concluded on May 19, 1942 because analyses were showing that sodium chloride was being absorbed and, with the progressive subjective deterioration, further prolongation of the experiment was not warranted, owing to the possibility of injury to the subjects.

SUBJECT 4 (the colostomy patient).—After instillation of 200 cc. of saline solution over a period of one hour the sodium chloride concentration was reduced from 3.3 per cent of sodium chloride to 1.7 per cent of sodium chloride. During this time 40 cc. of water was absorbed, as indicated by the recovery of 160 cc. of fluid. When 200 cc. of 1.7 per cent sodium chloride was used, the concentration was reduced to 1.17 per cent of sodium chloride over a period of one hour. There was recovered 80 cc. of fluid, indicating that 120 cc. of solution had been absorbed. The patient experienced no discomfort.

As can be seen in the chart, the sodium chloride concentration was diminished in every case both in states of dehydration and in normal hydration.

COMMENT

According to physiologic views, the site of water and salt absorption is in the distal portion of the small intestine and the colon. It would seem then that, regardless of into which end of the alimentary canal salt water was introduced, there would be little if any difference in the physiologic effect. The drinking of sea water results in the absorption of salt as a hypertonic solution and will necessitate the excretion of the salt eventually at the expense of body fluids. This excretion will be through the kidneys, as pointed out previously.

In a normal state of hydration the drinking of sea water will result in an extra loss of fluid with a subsequent dehydration. In a state of dehydration with the absorption of hypertonic salt water, there would be a tendency for sodium chloride to accumulate in the tissue spaces. The osmotic pressure of the extracellular tissue fluid being increased would remove fluid from the tissue cells themselves and from the blood stream. If administration of salt water is continued in the face of progressive dehydration, a state of edematous dehydration would occur. With the loss of fluids from the blood stream and hemoconcentration, a dangerous state of extrarenal azotemia is produced.

We have shown experimentally that sodium chloride as contained in sea water is absorbed from the colon. This is in agreement with the findings of Pittard.[6] However, our views as to the benefits incurred by this procedure are in absolute disagreement with those who advocate its use. We are convinced that the use of sea water per se by this means would not only not prolong life but would indeed actually hasten death.

The only further line of investigation that appears to be open is conceivably the use of salt free rations in conjunction with an amount of diluted sea water containing salt equal to that amount omitted from the rations. This problem of the use of salt free rations is being investigated.

SUMMARY AND CONCLUSIONS

It has been shown by both subjective and objective observations that the colon will not concentrate sea water and thus make water available to the organism. Therefore, by the same token, rectal instillations of sea water will not alleviate the symptoms of water deprivation.

Office of the Port Surgeon, New Orleans Port of Embarkation.

Laws of Osmotic Pressure.—Van't Hoff's laws of osmotic pressure may be simply stated: 1. The osmotic pressure of a solution varies directly as the concentration of the solution and is equal to the pressure the solute would exert if it were a gas in the volume occupied by the solution, if the volume of solute molecules relative to volume of solvent be negligible. 2. The osmotic pressure of a solution varies directly as the absolute temperature in just the same way as the pressure of a gas varies when its volume is kept constant. These laws of osmotic pressure, which were deduced from Pfeffer's data by Van't Hoff, have been thoroughly verified by the more accurate observations of Morse and of Berkley and Hartley. As is the case with gases, the laws of osmotic pressure hold closely only for dilute solutions. Appropriate corrections must be made for concentrated solutions.—West, Edward S.: Physical Chemistry for Students of Biochemistry and Medicine, New York, Macmillan Company, 1942.

REFLEX PULMONARY ATELECTASIS

GEZA DE TAKATS, M.D.
G. K. FENN, M.D.
AND
E. L. JENKINSON, M.D.
CHICAGO

Pulmonary atelectasis has important surgical, medical and roentgenologic implications. While there are many theories regarding the production of atelectasis, it is generally agreed that its essential cause is the obstruction of a bronchus with massive secretion.[1] The weakened respiratory force and the accumulation of bronchial mucus, owing to insufficient movement of cilia together with a suppressed cough reflex, are sufficient causes to explain postoperative atelectasis in the opinion of most observers.[2]

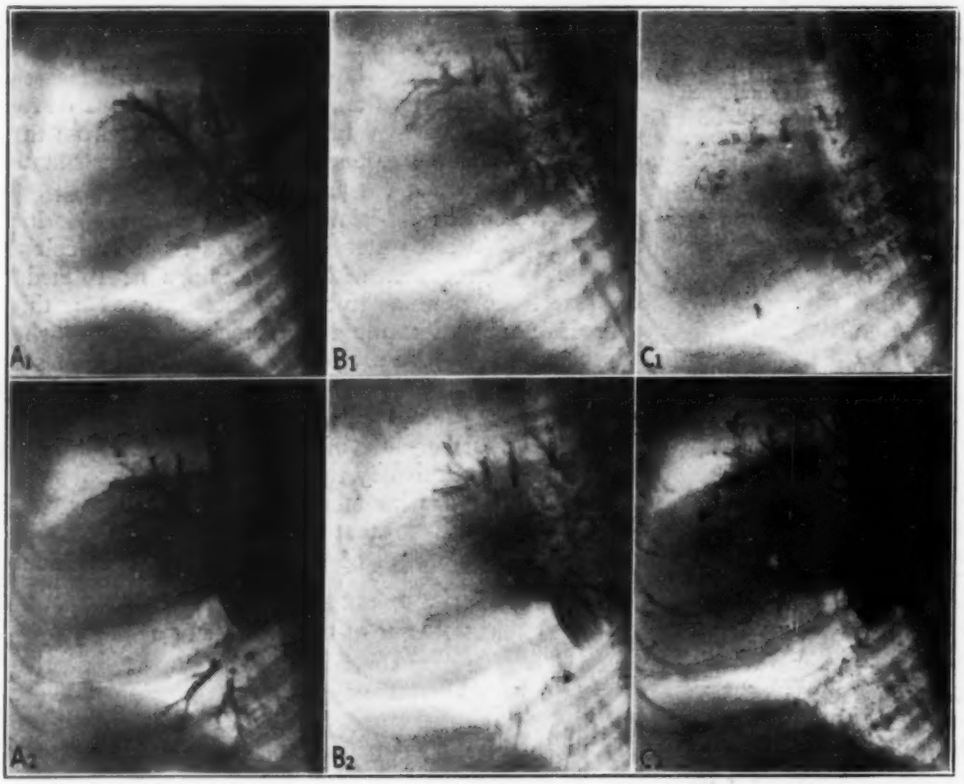


Fig. 1.—These films represent two sets of experiments, A_1 and A_2. The bronchograms were obtained five minutes after an intratracheal injection of a radiopaque.[9] The trachea and the larger bronchi are visualized. The upper bronchi are completely filled. In A_1 the lower bronchus did not fill at all. In B the films were obtained immediately after the production of a pulmonary embolus. An equal mixture of ferric chloride, barium sulfate and isotonic solution of sodium chloride was injected intravenously. The opaque material has been squeezed out of the large bronchi into the terminal radicles. The main bronchi are invisible. In C, the third series, both films were taken ten minutes after the production of the embolus. The pattern has remained the same. There seems to be some pooling of the opaque material around the middle lobe in C_2. There are patches of emphysema in C_2, in both the upper and the lower lobe, possibly due to incomplete bronchial obstruction.

But ever since the first descriptions of this interesting postoperative or post-traumatic complication, the suggestion has been made that reflex nervous stimuli play a part in the initiation of bronchial obstruction. In fact, three different reflex mechanisms were proposed: that of the diaphragmatic splint,[3] vasodilation with bronchial edema [4] and bronchoconstriction.[5] All three theories were discussed and discounted by Coryllos and Birnbaum.[2]

Recently, in studying the widespread autonomic reflexes which originate from the obstruction of the pulmonary artery, we became impressed with the effects of pulmonary embolism on the heart,[6] on the pulmonary arterial tree [7] and on the bronchi.[8] It was emphasized in these communications that the mortality and morbidity of pulmonary embolism is not due alone to the mechanical plugging of the pulmonary artery but to the reflex effects on the other thoracic viscera. Among other observations, the reactivity of the bronchial tree to the stimulus of pulmonary embolism was striking. Based on animal experiments and correlated with clinical observations, it is our feeling that the initiation of the bronchial obstruction may be due to early bronchomotor and bronchosecretory phenomena which may subsequently result in mechanical obstruction. If this is unrelieved, parenchymal damage will result.

EXPERIMENTAL EVIDENCE

One can readily demonstrate in the dog that the bronchial tree, visualized by the intratracheal instillation of a radiopaque medium,[9] invariably goes into spasm when pulmonary embolism is produced by a suspension of equal amounts of barium sulfate, ferric chloride and isotonic solution of sodium chloride (fig. 1). The decided change in the pattern of the bronchi is not brought about by dyspnea, lack of sufficient oxygen or increase in carbon dioxide, as a clamp applied to the trachea of the dog fails to produce it. Bilateral vagal section, however, inhibits bronchospasm (fig. 2). A sufficient dose of intravenous atropine sulfate prevents its occurrence in 60 per cent of the experiments (fig. 3). The addition of papaverine to the atropine is beneficial, since it has a direct action on the smooth muscle of the bronchi and because it is a

From the Department of Surgery, University of Illinois College of Medicine, and St. Luke's Hospital.

Read before the Section on Radiology at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1942.

1. Graham, E. A.; Singer, J. J., and Ballon, N. C.: Surgical Diseases of the Chest, Philadelphia, Lea & Febiger, 1935, chapt. 3.

2. Coryllos, P. N., and Birnbaum, G. L.: Postoperative Pulmonary Complications and Bronchial Obstruction, Surg., Gynec. & Obst. **50**: 795, 1930. Churchill, E. D.: Pulmonary Atelectasis, with Special Reference to Massive Collapse of the Lung, Arch. Surg. **11**: 489 (Oct.) 1925. Van Allen, C. M., and Lindskog, G. E.: Obstructive Pulmonary Atelectasis, ibid. **21**: 1195 (Dec., pt. 2) 1930.

3. Pasteur, W.: Massive Collapse of the Lung, Lancet **2**: 1351, 1908. Elliot, T. R., and Dingley, L. A.: Massive Collapse of the Lungs Following Abdominal Operations, ibid. **1**: 1305, 1914. Carlson, M. A.: Inhibition of Respiration as Factor in Pathogenesis of Postoperative Pulmonary Complications, J. Thoracic Surg. **2**: 196, 1932.

4. Scott, W. M. J.: Postoperative Massive Collapse of the Lung, Arch. Surg. **10**: 73 (Jan., pt. 1) 1925.

5. Macklin, C. L.: Functional Aspects of Bronchial Muscle and Elastic Tissue, Arch. Surg. **19**: 1212 (Dec., pt. 2) 1929.

6. de Takats, Geza; Beck, W. C., and Fenn, G. K.: Pulmonary Embolism, Surgery **6**: 339 (Sept.) 1939.

7. Jesser, J. H., and de Takats, Geza: Visualization of the Pulmonary Artery During Its Embolic Obstruction, Arch. Surg. **42**: 1034 (June) 1941.

8. Jesser, J. H., and de Takats, Geza: The Bronchial Factor in Pulmonary Embolism, Surgery, to be published.

9. The preparation used was iodochloral, an iodine and chlorine addition product of peanut oil.

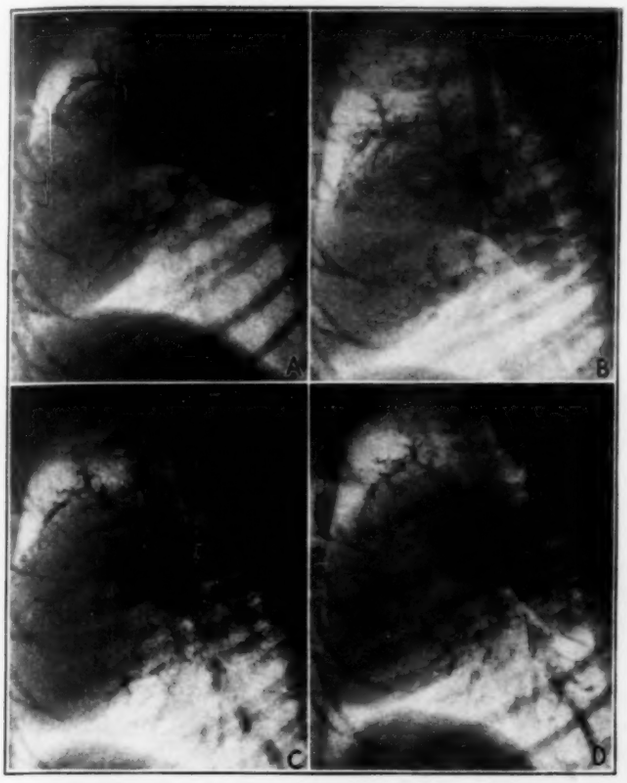


Fig. 2.—The effect of bilateral vagal section on the bronchial pattern following embolism: *A*, control film showing good visualization of the upper bronchus. *B*, film obtained two minutes after bilateral vagal section. The upper main bronchus seems more relaxed and its branches are wider than in the control film. *C* was obtained three minutes after the production of the embolus, showing no change in the pattern or caliber of the bronchial tree. *D* was taken ten minutes after the production of the embolus. The original pattern has been maintained. Compare this film with C_1 and C_2 of figure 1.

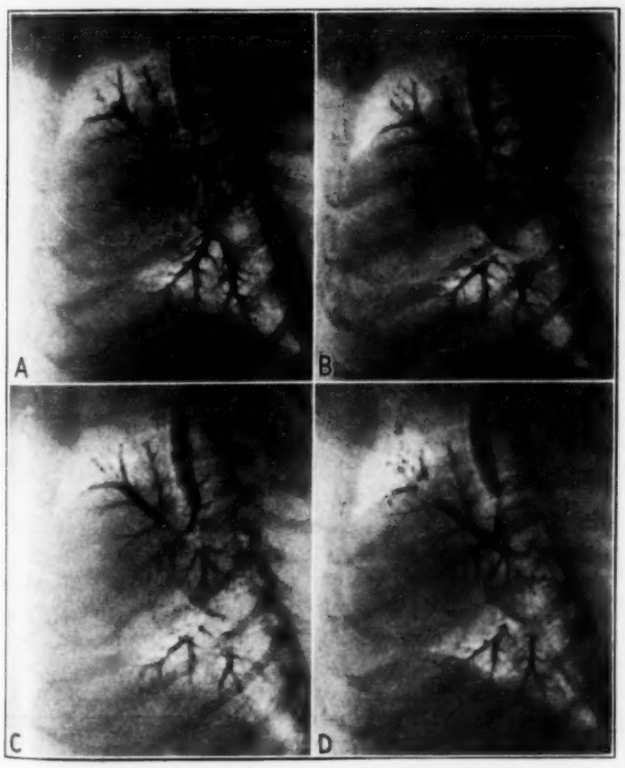


Fig. 3.—*A*, control film. *B*, film obtained after the intravenous injection of atropine 1/75 grain (0.0008 Gm.) and papaverine 1/2 grain (0.03 Gm.). *C*, film taken immediately after the production of an embolus. The bronchial pattern has been maintained. *D*, film taken four minutes after the production of the embolus. There is no evidence of bronchial spasm.

powerful coronary vasodilator [10] and inhibits ventricular fibrillation.[11] Both of these cardiac effects greatly improve the mortality of pulmonary embolism.

Evidence has also accumulated to show that, associated with a reflex bronchoconstriction, an increased bronchial secretion occurs in the experimental animal.[6] This is to be expected, as the vagal stimulation, which manifests itself in our previously published electrocardiograms and bronchograms, also results in bronchosecretion. We have, then, the essential factors in the production of atelectasis, namely obstruction and increased secretion. Whether contractions and secretion of the bronchus lead to collapse or overdistention of the lung depends on the force of inflation and the time allowed for deflation. As is shown in the clinical films, the high, splinted diaphragm and the hypoventilation of the affected side favor atelectasis instead of emphysema, but the latter is known to occur in pulmonary embolism.[12]

Having shown that pulmonary embolism constitutes a sufficient stimulus for bronchoconstriction and bronchosecretion, we were interested in finding other stimuli which affect the bronchial tree equally. Of various intra-abdominal manipulations, traction of the cystic duct and pulling on the mesentery gave an equally convincing bronchial pattern (fig. 4). This change in pattern was again inhibited by the use of atropine (fig. 5).

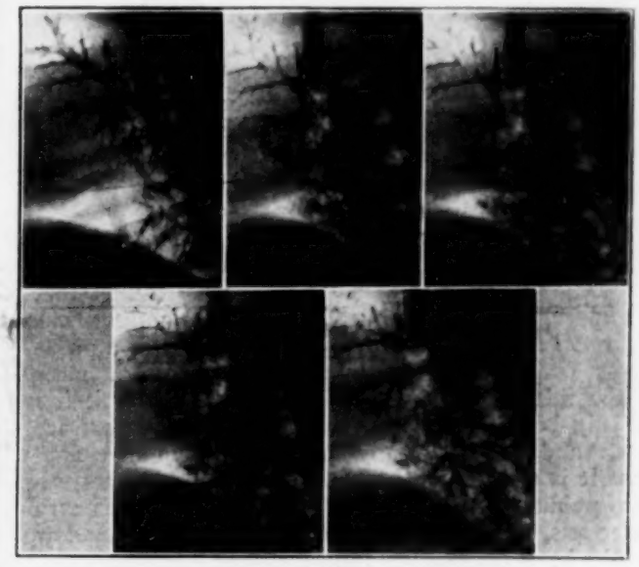


Fig. 4.—From left to right and from above down: The first film is the bronchial tree visualized in the usual manner. The second film shows the pattern after opening of the abdomen. The pattern is essentially unchanged except for a better filling of the bronchi in the lower lobe. The third film was obtained immediately after energetic traction on the cystic duct. The next film was taken three minutes and the last film was taken ten minutes after traction. Note the pronounced scattering in the last film, resembling the one obtained after pulmonary embolism. No large bronchi are visible in this film. Judging from the narrowed intercostal spaces and the poor aeration of the lung, the chest seems to be fixed in expiration, or atelectasis is present.

Blunt injury to the chest wall with or without rib fracture gives a spasm of the bronchial tree, which again can be prevented by the administration of 1/6 grain (0.01 Gm.) of atropine in half of the cases (figs. 6 and 7).

10. Rossler, H.: Ueber experimentelle Herzschadigung durch Koronargefassverengerung mit ihrer Beeinflussung durch Pharmaka, Arch. f. exper. Path. u. Pharmakol. **153:** 1, 1930.

11. Linder, E., and Katz, L. N.: Papaverine Hydrochloride and Ventricular Fibrillation, Am. J. Physiol. **133:** 155, 1941.

12. Westermark, N.: On the Roentgen Diagnosis of Embolism, Acta radiol. **19:** 357, 1938.

The demonstration that at least three distinct stimuli, namely pulmonary embolism, intra-abdominal manipulation and trauma to the chest wall, were capable of changing the caliber and pattern of the bronchi warranted a search for such phenomena in patients. It should be noted in the accompanying table that the effect of all these stimuli was modified by the use of atropine.

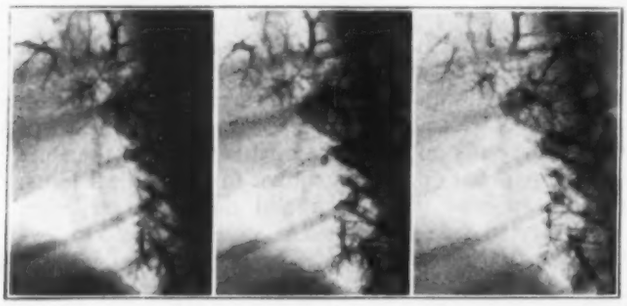


Fig. 5.—Left film: Upper bronchus visualized. Atropine ¼ grain (0.01 Gm.) has been injected intravenously. Middle film: traction on the cystic dust produced no change in the pattern. Right film: pattern unchanged after ten minutes. The atropine seems to have blocked the reflex bronchospasm originated from abdominal manipulation.

CLINICAL OBSERVATIONS

Interpretation of the roentgen studies on patients in the light of the experimental work brings us a bit into the field of speculation. At the same time, we believe that the experimental work finds confirmation in the films of patients.

We have been taught in the past to look for a funnel shaped or triangular shadow as evidence of an infarct following pulmonary embolism We were taught that the infarct was primarily of circulatory origin and was likely to become infected and run the course of a pneumonia, or that an abscess was likely to form at the site of the infarct All these things do occur, but it has recently been pointed out that triangular infarcts are rare,[13] and this is certainly borne out by our investigation It is our belief that if the x-ray shadow that follows pulmonary embolism is due to reflex pulmonary atelectasis, then there is no good reason why the shadow should be triangular or funnel shaped. Furthermore, we believe that if the bronchial obstruction is due to

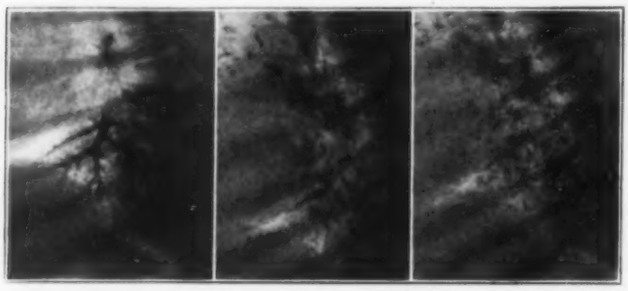


Fig. 6.—The control film on the left shows good pattern of the lower bronchus. The film in the middle was obtained immediately after blunt trauma to the opposite chest wall, resulting in fractured ribs. The film to the right was taken ten minutes after the trauma to the chest. The opaque material is scattered and not even smaller bronchi are visible.

reflex constriction and if this constriction can be relieved, there is no good reason why the patient should have a pneumonic episode. The patient's defervescence often corresponds with the time of sudden massive expectoration of bloody mucus, which makes the course of the infarct look suspiciously similar to that of an atelectasis. On the other hand, patients with pulmonary infarcts who exhibit a lengthy course of fever obviously have pneumonia or a lung abscess at the site of the infarct. In a case of reflex atelectasis the decisive factor in the course of events is whether or not the bronchial obstruction is relieved. The relief of this bronchial obstruction should be one of the therapeutic aims.

From a roentgenologic point of view, the diagnosis of pulmonary embolism is seldom possible. The triangular infarct is seldom seen. In the first twenty-four hours nothing but the high-splinted diaphragm on the involved side may be evident (fig. 8). In two to three days an area of consolidation appears which may be pneumonic or atelectatic (fig. 9). The patient made a complete clinical recovery within six days under appropriate medication and without the use of the sulfa drugs. Under the circumstances, it is difficult to escape the conclusion that the consolidation here was atelectasis and not pneumonia. The patient whose chest is shown in figure 10 had the clinical symptoms of pulmonary

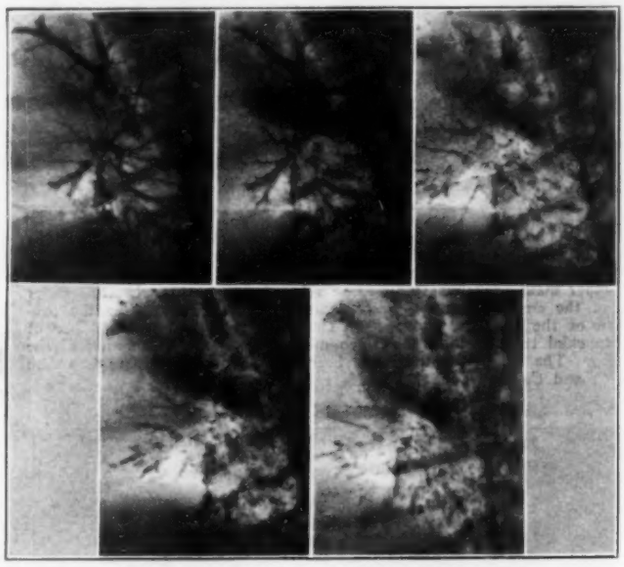


Fig. 7.—The effect of trauma to the chest in an atropinized dog (read from left to right and from above down): The first film was obtained five minutes after the intratracheal injection of a radiopaque oil.[9] The next film was obtained after the dog was atropinized with an intravenous injection of ¼ gram of the drug. The third film was taken immediately after a severe trauma to the chest, producing fractured ribs. Note again the scattering of the opaque solution due to the mechanical effect of the injury. The outline of the bronchi, however, is still present. The fourth film shows a maintenance of this residual pattern three minutes after the injury. The last film was taken ten minutes after the injury. In the last three films atelectasis of the upper lobe is increasingly evident. The atropine produced a partial protection, none against the shattering effect of the blow.

embolism three days prior to the day the film was made. Yet, in five days (fig. 11) the consolidation had almost disappeared. We believe that this points to atelectasis as the cause of the shadow. Without clinical data the radiologist should not be expected to make a diagnosis of pulmonary embolism.

We have described elsewhere what we consider to be the appropriate treatment of pulmonary embolism. Atropine and papaverine play an important part in it. The use of atropine in the presence of bronchial obstruction and hypersecretion may be objected to by many who feel that this drug increases the viscosity of the bronchial mucus and hinders evacuation. However, in the first few minutes and hours following pulmonary embolism atropine dilates the bronchi, as shown in our experimental films, and suppresses secretion. We now have data on 28 patients suffering from pulmonary

13. Hampton, A. O., and Castleman, B.: Correlation of Postmortem Chest Teleroentgenograms with Autopsy Findings, Am. J. Roentgenol. 43: 305, 1940.

embolism in whom the atropine-papaverine mixture was administered three times a day for three days. No massive atelectasis was seen in this group, indicating that the medication could not have increased the bronchial obstruction to a harmful degree.

Reflex Bronchial Spasm: Summary of Experiments

Method of Production	Number of Dogs	Method of Prevention	Bronchial Spasm, per Cent
Pulmonary embolism	12	None	100
	37	Atropine or atropine papaverine	42.5
	4	Bilateral vagotomy	0
Abdominal manipulation	10	None	100
	10	Atropine	30
Trauma to chest	10	None	60
	10	Atropine	30
Total animals used	93		

The second form of reflex atelectasis, namely that occurring during surgical procedures, has now been reported several times. At the Research and Educational Hospitals Dr. W. E. Cassels has observed and studied it on several occasions. Of the many factors which may be responsible for such an occurrence might be mentioned insufficient premedication with atropine or scopolamine, too light an anesthesia, trauma at intubation, position of the patient and possibly the parasympathetic action of cyclopropane.[14] In the individual case it is rarely possible to accuse any single factor for the atelectasis. By observing the expansion of the two chest walls, massive atelectasis can be detected easily and aborted by hyperventilation and suction by catheter. Quite recently one of us (G. de T.) observed atelectasis of the right upper lobe within a few seconds after the surgical closure of an arteriovenous fistula. It is well known that such a closure produces vagal phenomena such as bradycardia.

Traumatic atelectasis deserves more recognition than it has received in the past. When contusions of the chest wall are thoroughly studied with roentgen rays some evidence of pulmonary change has been observed in roughly three fourths of the cases. When fractured ribs were present 86.7 per cent of the patients had roentgen changes in the lungs, while in the absence of fracture 65 per cent showed some pulmonary involvement.[15] Westermark thought that hemorrhages into and around the bronchi may cause bronchostenosis or atelectasis. Our observations would again suggest that there may be a nervous reflex involved in some of these obstructions, and instead of strapping the ribs and augmenting hypoventilation the painful ribs should be injected with procaine hydrochloride, as Harmon and his associates[16] do, and ventilation encouraged. This, of course, does not apply to the group suffering from a hemothorax or interstitial emphysema.

COMMENT

The experimental findings of a reflex bronchoconstriction and bronchosecretion following pulmonary embolism fit in with the early clinical and roentgen observations in man. But this concept also has a far broader significance in regard to the production of atelectasis in general. If the embolic atelectasis is originated by a nervous reflex, why could not the surgical or the traumatic atelectasis be initiated by the same mechanism. Our animal experiments indicate that this is at least a possibility.

Since 1919 Cutler[17] has repeatedly stated his belief that the majority of postoperative complications are due to emboli from the surgical field. He excluded the massive fatal emboli and stressed the patches of consolidation around small thrombi. This theory now receives experimental support. On the basis of our present observations, we would assume that such thrombi produced reflex bronchial spasm and secretion to account for the consolidations.

We do not wish to imply, however, that a small embolus is necessarily present in all cases of reflex atelectasis. Gilbert, Fenn and LeRoy[18] have shown that abdominal stimuli can produce reflex cardiac effects which are due either to vagal stimulation or to sympathetic inhibition. While ether is known to be a bronchial dilator, some anesthetics, such as cyclopropane, may facilitate vagal tone. The beginning of atelectasis may often be on the operating table, and the well trained anesthetist is always on the lookout for a unilateral lag

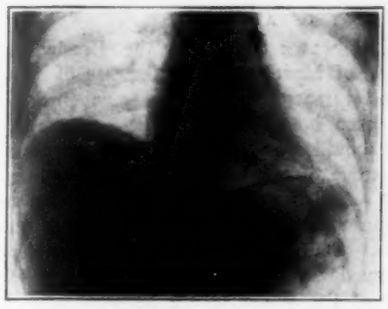


Fig. 8.—Portable film obtained ten days after a hysterectomy, six hours after the onset of a sudden chest pain and dyspnea. Note the elevation of the diaphragm on the right, a perfectly aerated, perhaps even slightly ephysematous, right lower lobe.

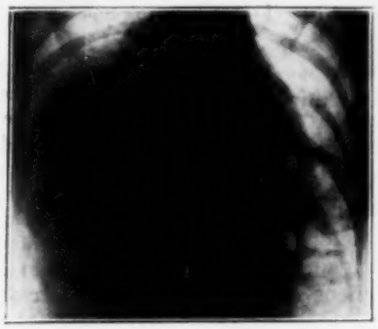


Fig. 9.—Portable film obtained two days after the film shown in figure 8 was taken. While clinically the patient ran the typical course of a pulmonary infarct, with phlebitis, bloody sputum and diaphragmatic pain, the film shows an atelectasis of the right lower lobe, with a splinted high diaphragm and narrowed intercostal spaces. Such patients often show right upper rectus rigidity simulating gallstone colic.

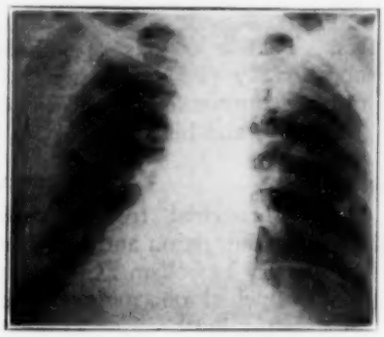


Fig. 10.—Film obtained fourteen days after an electric resection of the prostate. The patient had chills and fever and was first thought to have a tumor of the right upper lobe. Embolism was diagnosed as a phlebitis and rusty sputum later developed.

14. Rovenstine, E. A.: Parasympathomimetic Action of Cyclopropane on Reptilian and Amphibian Heart, Current Researches in Anesth. & Analg. **21**: 111, 1942.

15. Westermark, N.: A Roentgenologic Investigation into Traumatic Lung Changes Arisen Through Blunt Violence to the Thorax, Acta radiol. **42**: 331, 1941.

16. Harmon, P. H.; Baker, D. R., and Kornegay, R. D.: Uncomplicated Fractures of Ribs and Major Injuries of the Chest Wall, J. A. M. A. **118**: 30 (Jan. 3) 1942.

17. Cutler, E. C., and Hunt, Alice M.: Postoperative Pulmonary Complications, Arch. Int. Med. **29**: 449 (April) 1922.

18. Gilbert, N. C.; Fenn, G. K., and LeRoy, G. V.: The Effect of Distention of Abdominal Viscera, J. A. M. A. **115**: 1962 (Dec. 7) 1940.

of costal breathing. Hyperventilation with carbon dioxide is easily accomplished at this stage. The Trendelenburg position of recently operated patients is an additional help toward bronchial drainage. That the stimulation of lung or pleura is capable of initiating vagal reflexes is sufficiently known, and the literature of this subject is summarized elsewhere.

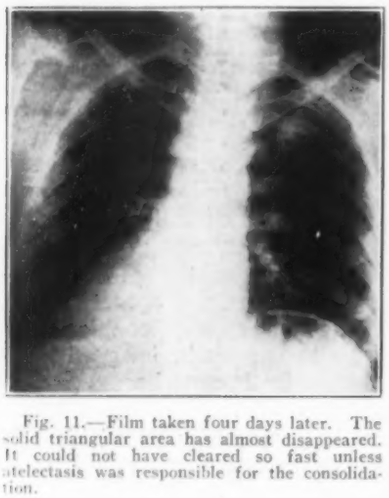


Fig. 11.—Film taken four days later. The solid triangular area has almost disappeared. It could not have cleared so fast unless atelectasis was responsible for the consolidation.

It is far from our belief that the form of bronchoconstriction and bronchosecretion discussed here is the only mechanism by which atelectasis is produced. Lobar collapse is well known to occur from peribronchial compression by glands, by tumors or by swelling of the mucous lining around foreign bodies. That injections of iodized poppy seed oil may occasionally produce spasm followed by atelectasis in normal contractile bronchi was demonstrated in 1929 by Jacobaeus and his associates.[19]

SUMMARY

The bronchial tree is capable experimentally of decided contraction and secretion immediately following pulmonary embolism. Clinical and roentgen data show that bronchial obstruction with subsequent atelectasis is a factor in the production of clinical and roentgen findings in pulmonary embolism. Additional data suggest that reflex atelectasis may occur from other sources than pulmonary embolism. Its early recognition and treatment are stressed.

122 South Michigan Avenue.

ABSTRACT OF DISCUSSION

DR. LOUIS H. CLERF, Philadelphia: My knowledge of this subject is limited to postoperative pulmonary atelectasis. I have seen and treated many of these cases by bronchoscopy and always have been interested to know why a previously normal bronchus should secrete thick, tenacious secretion in large quantity and why there was an absence of adequate ciliary activity so that the secretion accumulated and ultimately produced bronchial obstruction. This usually was explained in a vague manner as being due to secretory or other disturbances. Possibly de Takats and his associates have given us the explanation. On the basis of their experimental work it affords a reasonable explanation. I am also interested in their reference to atropine and the fact that it probably would inhibit the occurrence of this. I have always advocated no atropine because it increases the viscosity of secretions and diminishes the quantity.

DR. G. K. FENN, Chicago: Atropine doesn't seem to do any harm. The theory behind the atropine is to block off the vagal effects which produce bronchial constriction. At the same time it might be expected that this would cause more viscid mucus, but, as we cited in the paper, the atropine has been used very liberally, and no untoward results have occurred.

19. Jacobaeus, H. C.; Selander, G., and Westermark, N.: A Study of Acute Massive Atelectatic Collapse of the Lung, Acta med. Scandinav. 71: 439, 1929.

Clinical Notes, Suggestions and New Instruments

SPONTANEOUS RUPTURE OF THE NORMAL SPLEEN

JAMES R. WATSON, M.D., AND MURRAY FERDEBER, M.D.,
PITTSBURGH

Rupture of the spleen may result from trauma or it may occur spontaneously. Spontaneous rupture is uncommon and usually occurs in the presence of splenomegaly, in most instances the result of malaria or typhoid. It has been reported less frequently during the course of puerperal sepsis, relapsing fever, pneumonia, cirrhosis of the liver, leukemia, typhus and infectious mononucleosis. Several cases have been reported in which it occurred during a normal pregnancy. In a few instances rupture had occurred spontaneously in a healthy individual with a normal spleen. Attempts to explain this phenomenon are confusing and, from a practical point of view, purely academic. Hamilton Bailey dismissed the subject by stating that "only the spleen can behave in this curious manner," a remark reminiscent of Galen, who spoke of the spleen as an organ "full of mystery."

The following report illustrates most of the diagnostic problems involved and bears out another of Bailey's remarks: "In atraumatic hemoperitoneum in the male examine first the spleen."

REPORT OF A CASE

A white man aged 27 was admitted to the Presbyterian Hospital on the morning of March 23, 1942 because of severe pain under the left costal margin which had awakened him out of a sound sleep seven hours before. The pain radiated up to the left scapula, shoulder and left side of the neck and was accompanied by a sense of oppression and inability to get his breath. He was nauseated but did not vomit. Any attempt to get out of bed increased the severity of the pain to such a degree that it was two hours before he was finally able to get up and make his way down one flight of stairs to get help. He fainted at the foot of the stairs, where he was found by his landlady. One of us (M. F.) saw him within the next fifteen minutes, and physical examination at that time was negative save for pallor of the face which was most pronounced about the lips, rapid pulse, and heart sounds which were of poor quality and slightly irregular in rhythm and intensity. The blood pressure was 118 mm. of mercury systolic and 70 mm. diastolic. Examination of the abdomen was entirely negative. Coronary occlusion was thought to be the most likely diagnosis, so a hypodermic of an antispasmodic preparation was administered and arrangements were made to take the patient to the hospital.

The past medical history was entirely negative except for some of the exanthemas of childhood. He had been dismissed from the Army three months before the onset of his illness in order to permit him to return to his former office position as an essential employee in a war industry. He had had no injuries of even a minor nature that he could recall, and his sedentary life since leaving the Army had not subjected him to any trauma or excessive exertion.

The only additional physical abnormality on admission to the hospital was the presence of ecchymosis on the dorsum of the right hand, on the right elbow and about the left eye, apparently the result of the fall. The patient was comfortable as long as he lay quietly in bed. An electrocardiogram taken shortly after admission failed to show evidence of degenerative change, although a slight elevation of the RS-T interval in leads 2 and 3 was considered a possible early indication of a myocardial infarct. A roentgenogram of the chest taken with a portable machine was negative. The blood count was reported as 4,210,000 red blood cells and 20,650 white blood cells per cubic millimeter of blood. The hemoglobin was 84 per cent. There were 68 per cent polymorphonuclears, 29 per cent lympho-

From the Presbyterian Hospital and the Department of Surgery of the University of Pittsburgh School of Medicine.

cytes and 3 per cent monocytes. The urine was negative save for a trace of albumin.

The symptoms again became somewhat more severe in the afternoon and, for the first time, signs suggestive of an intra-abdominal lesion began to appear. These consisted of point tenderness on deep palpation in the epigastrium just to the right of the midline and rebound tenderness to a slight degree over the lower part of the abdomen. There was no rigidity, distention or discoloration. One of us (J. W.) was asked to see the patient on surgical consultation, and on the basis of the history and the aforementioned conditions a presumptive diagnosis of a perforated peptic ulcer was made. The roentgen examination was repeated with the patient in the upright position in an effort to detect the presence of gas beneath the diaphragm, but this was entirely negative; nor was there any tenting of the diaphragm suggestive of fluid. The findings were nevertheless considered sufficiently positive to warrant abdominal exploration, and this was carried out sixteen hours after the onset of symptoms.

Under spinal anesthesia, later supplemented by cyclopropane, an upper midline abdominal incision was made. As the incision reached the peritoneum blood could be seen through it. A plasma transfusion was started and the abdominal cavity was opened, revealing a large amount of liquid blood which obscured everything and which was estimated to amount to about 1,500 cc. Three hundred cc. was removed, and then the procedure was abandoned as useless, as it seemed to make no impression on the amount remaining. The liver or the spleen was thought to be the most likely source of the hemorrhage. The liver was perfectly normal on palpation, but when the hand was inserted into the upper left abdominal quadrant a large hematoma was felt at the lower pole of the spleen. The spleen felt to be of normal size, was in its normal position and was not adherent to the diaphragm. Splenectomy was performed and the incision was closed in anatomic layers without drainage. The patient had received 500 cc. of plasma during the operation and left the operating room in fair condition with a pulse rate of 120 beats a minute and a blood pressure of 160 mm. of mercury systolic and 70 mm. diastolic. Five hundred cc. of whole blood was given shortly after operation, and this was repeated the following day.

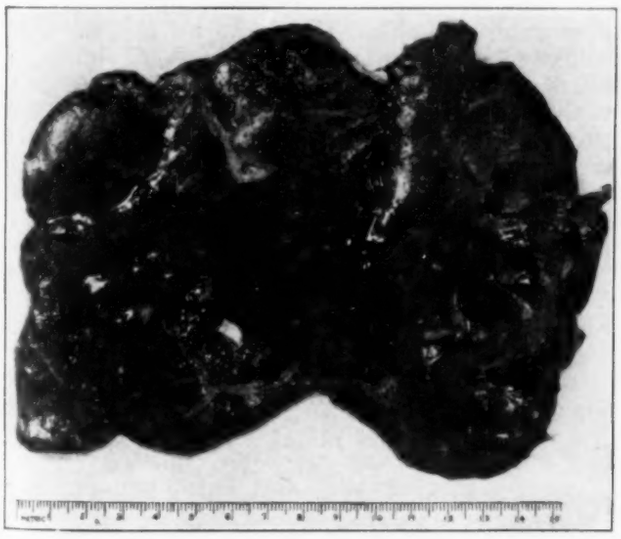


Fig. 1.—Sagittal section of the spleen showing the area of hemorrhage near the inferior pole. The anomaly is demonstrated by the presence of a glass rod to the right of the midline and by a defect in the tissue to the left.

The day after operation the blood count had dropped to 3,430,000 red blood cells per cubic millimeter of blood and the hemoglobin to 68 per cent; the following day to 3,150,000 red blood cells and 65 per cent respectively. After the second transfusion the counts began to rise again, and at the time of discharge from the hospital there were 4,860,000 red blood cells per cubic millimeter of blood with 89 per cent hemoglobin. Blood platelet counts, repeated at intervals, were well within normal limits. The Kline test gave a negative reaction.

The spleen measured 11 by 8 by 3.5 cm. There was an anomaly present in the form of a capsule-lined slit 1 cm. in width which extended through from the diaphragmatic to the hilar surface. The capsule was absent from about one half

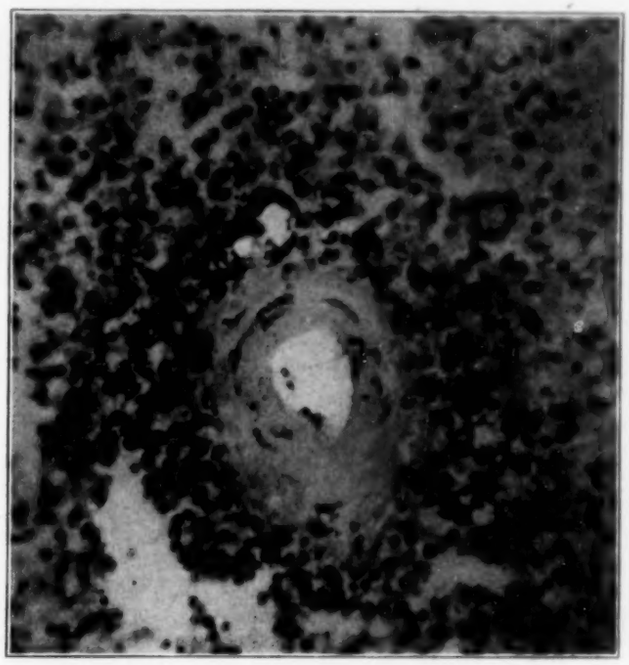


Fig. 2.—A small artery showing intimal thickening and irregular hyalinization of the wall; × 400.

of the inferior diaphragmatic surface. There was a small blood clot under the edge of the remaining capsule, and on cut section this was seen to extend into the splenic pulp along the course of a blood vessel. There was no connection between the anomaly and the site of hemorrhage. On microscopic study the arteries were found to show thickening of the intima and hyalinization of the walls. The sinuses were somewhat dilated and showed the presence of an occasional polymorphonuclear cell. There was some trabecular and capsular fibrosis.

The patient made an uneventful recovery and left the hospital eighteen days after admission. Two weeks later he returned to his home in a neighboring state to continue his convalescence. While there, he was in bed for two weeks with intermittent fever, headaches and cloudy urine which the family physician said was due to the presence of blood. This syndrome gradually subsided, and when next seen two months after operation he appeared to be in excellent health and stated that he felt fine. Physical examination as well as a blood count and urinalysis at this time were negative. He has returned to work and is symptom free except for slight fatigue, which is gradually disappearing.

COMMENT

In most of the cases reported in the literature an operation was performed under the impression that the signs and symptoms were the result of a perforated peptic ulcer, although in a few women in whom pregnancy was suspected the preoperative diagnosis had been ruptured ectopic pregnancy. Localization of the pain in the epigastrium and radiation to the shoulder have not always been present as they were in this case, making the differentiation between an upper and a lower abdominal lesion difficult at times. The most important factor is the early recognition of an intra-abdominal lesion and operation as soon as possible. While the lesion is not common, Bailey's aphorism might be recommended with profit to any one who does emergency abdominal surgery.

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Special Article

HANDBOOK OF NUTRITION: XII

FOODS OF PLANT ORIGIN

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These special articles on foods and nutrition have been prepared under the auspices of the Council on Foods and Nutrition. The opinions expressed are those of the authors and do not necessarily reflect the opinion of the Council. These articles will be published later as a Handbook of Nutrition.—ED.

Over 50 per cent of the American diet consists of foods of plant origin. Indirectly as foods for animals, plant products make an additional contribution to the human diet through their influence on the nutritive value of animal products.

In discussing nutritive values, it is necessary to make use of certain average figures for nutrient composition. Foods of plant origin are subject to rather wide variations in composition as influenced by genetic, soil and climatic factors. It is beyond the scope of this article to consider these factors. Their importance is illustrated by the study of Schultz and his co-workers [1] revealing wide variations in the thiamine content of wheat and of cereal grains of different origin. Some of the factors influencing mineral nutrition have recently been reviewed by Maynard [2] and by Beeson.[3] Fortunately the consumer seldom gets his supply of a given food from a single agricultural source, and thus the significance of the wide variation in the composition of crops differently produced is not nearly so great as the individual values might suggest. There are also variations in foods as consumed caused by processing, storage and cooking factors. In the present article attention is called to these factors if they have a particular bearing on the significance of the average values cited. For convenience of discussion, the foods of plant origin are grouped as follows: cereals, legumes and nuts, potatoes, other root crops, tomatoes, leafy vegetables, miscellaneous vegetables, fruits, sugar, syrups and molasses and vegetable oils.

CEREALS

Under cereals are included the cereal grains and their products, including flour, bread, breakfast foods, crackers, cookies, pastry and macaroni. Because of the low cost of cereals in relation to most other foods, their consumption is largest among the low income groups. The importance of these foods in the diet has been set forth editorially in THE JOURNAL [4] as follows:

> The cereal grains are the backbone of the nutrition of most of the races of the earth. They are, as a rule, the cheapest sources of food fuel; so that corn, wheat, rice, rye, barley and oat kernels are to be found constituting a third or often much more of the calory intake of the millions of persons involved.

Cereals also provide a third or more of the protein of the American diet. While this protein is not so high in biologic value as that of animal products, combinations of cereal and animal protein provide a diet of excellent protein quality. Important amounts of phosphorus, iron, copper and other minerals and of certain vitamins are supplied by cereals. Generalizations here are of limited value, however, because of the differences among cereals and the losses which result on milling.

Wheat.—Wheat is by far the leading cereal in the diet in the United States, furnishing approximately 25 per cent of the total calories consumed. The total per capita flour consumption for 1941 is estimated at 155 pounds (70 Kg.), 97 per cent of which was the milled product, leaving less than 5 pounds (2 Kg.) as whole wheat or graham flour. The consumption of wheat breakfast foods approximated 1½ pounds (0.7 Kg.) per capita. The proximate composition of the flours, as listed by Chatfield and Adams,[5] is presented in table 1.

It is clear that wheat makes a substantial contribution to the protein needs of the diet. Using the percentage figure for patent flour, one may calculate that the average daily consumption of 6 9/10 ounces (225 Gm.) of flour supplies 22 Gm. of protein daily, or nearly one-third the daily allowance. Whole wheat contains more protein than white flour, and its protein has a higher biologic value, but when white flour is supplemented with milk, eggs or meat, a protein mixture of high biologic value results. The much lower fiber content of patent flour reflects the removal of the bran in milling. While bran contributes laxative qualities to the diet, it is poorly digested and may be somewhat irritating to the mucous membranes of the digestive tract. The physiologic effects of bran have been reviewed by the Council on Foods.[6]

In table 2 are presented the vitamin and mineral values of whole wheat and white flour and, for comparative purposes, the minimum values set by the United States government for enriched flour. The values for thiamine, riboflavin, nicotinic acid and iron are taken from Ferrari.[7] Those for pantothenic acid and pyridoxine were supplied by Elvehjem.[8]

The large milling losses of vitamins and minerals are evident from this table. The data show that the outstanding superiority of enriched flour over ordinary white flour lies in its fivefold increase in thiamine content, the figure being 75 per cent of that for whole wheat flour. On the other hand, the enrichment in nicotinic acid and iron is small compared with the amounts present in whole wheat flour. The data show that milling results in a 60 per cent loss of pantothenic acid and a 50 per cent loss of pyridoxine. Much of the phosphorus and certain other minerals is also lost.

The enriched flour now on the market is nearly all produced by adding the nutrients in question to the refined product. A somewhat similar result can be achieved by "longer extraction" in milling, that is by retaining some of the vitamin and mineral rich portions of the wheat which are milled out in making patent flour. This is the procedure officially adopted in Canada, as described by Tisdall and his associates [9] and by Newman.[10]

1. Schultz, A. S.; Atkin, L., and Frey, C. N.: A Preliminary Survey of the Vitamin B Content of American Cereals, Cereal Chem. **18**: 106 (Jan.) 1941.
2. Maynard, L. A.: Relation of Soil and Plant Deficiencies and of Toxic Constituents in Soils to Animal Nutrition, Ann. Rev. Biochem. **10**: 449, 1941.
3. Beeson, K. C.: The Mineral Composition of Crops with Particular Reference to the Soils in Which They Are Grown, Miscellaneous Bulletin 369, United States Department of Agriculture, March 1941.
4. The Cereals in Nutrition, editorial, J. A. M. A. **95**: 1101 (Oct. 11) 1930.
5. Chatfield, C., and Adams: Proximate Composition of American Food Materials, Circular 549, United States Department of Agriculture, June 1940.
6. Council on Foods: The Nutritional Significance of Bran, J. A. M. A. **107**: 874 (Sept. 12) 1936.
7. Ferrari, C. G.: Vitamin and Mineral Enrichment of Foods, Northwestern Miller **210**: 3 (April 29) 1942.
8. Elvehjem, C. A.: Personal communication to the author.
9. Tisdall, F. F.; Jackson, S. H.; Drake, T. G. H.; Newman, L. H.; Whiteside, A. G. O.; Miller, H., and Edgar, J.: The Retention of the Wheat Vitamins in Flour and Bread, a Problem of National Importance, Canad. M. A. J. **45**: 101 (Aug.) 1941.
10. Newman, L. H.: The Retention of B Vitamins in Flour and Bread, J. Am. Soc. Agronomy **34**: 109 (Feb.) 1942.

Wheat flour is consumed to a large extent in the form of bread, of which 85 per cent is commercially baked. Most of this bread is made from white flour, but it is estimated that approximately 35 per cent of the bread now consumed is the enriched product. This enriched bread is obtained either by the use of enriched flour or enriched yeast or by the direct addition of the specified minerals and vitamins to the dough.

An important factor in the nutritive value of bread is the extent to which skim milk solids are used in its manufacture. Six per cent of these is mentioned as the desirable amount in modern bread, but apparently much bread is made with 3 per cent or even less when the cost of skim milk is high. Whole wheat bread is commonly made without milk solids. The inclusion of 6 per cent of the solids increases the calcium content of white bread four times and the phosphorus content twice and adds 60 micrograms of thiamine and 360 micrograms of riboflavin per pound. It also improves the protein value considerably.

TABLE 1.—*Proximate Composition of Whole Wheat and of White Flour*

	Protein, per Cent	Fat, per Cent	Carbohydrates, per Cent	Crude Fiber, per Cent	Fuel Value per 100 Gm., Calories
Wheat flour, graham..	13.0	2.0	72.4	1.8	360
Wheat flour, patent....	10.8	0.9	75.9	0.3	340

The proposed minimum standards which are now being followed for enriched bread are, per pound, thiamine 1 mg., riboflavin 0.8 mg., nicotinic acid 4 mg. and iron 4 mg.[7] A similar content of skim milk solids being assumed, the thiamine content is approximately three times as large as that of ordinary bread, the iron content is doubled and the nicotinic acid content is increased slightly. In these and in other nutrients the enriched product falls considerably short of whole wheat bread.

Since whole wheat bread contains the bran which is largely absent in white or in enriched bread, the question of relative digestibility is an important one. This question was thoroughly studied by Rubner[11] during World War I. He found that the advantage of the higher protein content of the unmilled product was offset by its lower digestibility and that it contained slightly less total available calories. Noteworthy modern studies have recently been published by Murlin and his associates.[12] The first study shows that whole wheat bread has in general a lower protein digestibilty value but a higher protein biologic value. The second study reveals no significant differences in the digestibility of the carbohydrates of the two breads. The authors point out that any differences in protein or in available energy values are small and of little importance as compared with differences in vitamins and minerals.

Corn.—Corn meal is the chief form in which corn is used as human food, representing a per capita consumption of 23 1/10 pounds (11 Kg.) in 1939. An additional 8 pounds (4 Kg.) is consumed as breakfast foods, grits, hominy and canned corn.

The corn grain is approximately equal to the wheat grain in thiamine content but contains only one-fourth as much nicotinic acid. It is a good source of phosphorus and iron and certain other minerals. But most of the corn meal and flour consumed, as well as the hominy, grits and breakfast foods, is in the form of milled products. The milling process removes the germ and the bran and thus takes out most of the thiamine and minerals present in the entire kernel. The corn products must therefore be considered to be primarily energy yielding foods. They contain 8 to 9 per cent of protein, which ranks below wheat in biologic value but which combines with milk to provide a protein mixture of high quality. Yellow corn meal differs from the white variety, as well as from other cereals, in containing a significant amount of vitamin A: 350 to 500 international units per hundred grams. In view of the rather large consumption of corn meal and other milled corn products by certain groups of the population, the wider use of the unmilled meal or the development of milling methods which would retain nutrients now lost would be highly desirable.

Canned corn is equal to corn meal in energy and protein on an equivalent moisture basis and is superior to the milled product in mineral and thiamine content.

Oats.—Among the breakfast food cereals, oatmeal and rolled oats, the principal forms in which oats are consumed, rank first both in quantity eaten and in nutritive value. Approximately 529 million pounds (240 million Kg.) is consumed annually. In the milling of oats, only the fibrous hull and the adhering portions are removed, the germ and the other vitamin-rich and mineral-rich portions being left with the product used for human food. Thus oatmeal ranks nutritionally as a whole grain cereal rather than as a milled product.

Oat cereals rank above wheat products both in fuel value and in protein content. Their higher fuel value is due primarily to their fat content (7.4 per cent). Their protein content, of over 14 per cent, outranks that of white wheat flour in biologic value. Both oatmeal and rolled oats are low in crude fiber and when properly cooked are highly digestible.

Oatmeal is considerably richer than whole wheat in thiamine. Aughey and Daniel[13] reported that one hundred and twenty minutes' cooking in a double boiler did not cause any appreciable loss of thiamine from rolled oats. According to Andrews, Boyd and Terry,[14] the riboflavin content of the oat grain averages 0.58 mg. per pound. Elvehjem[8] has found the following values for other vitamins in oats: nicotinic acid 0.45 to 0.68 mg. per pound, pantothenic acid 12.2 to 13.6 mg. per pound and pyridoxine 0.72 to 0.90 mg. per pound.

TABLE 2.—*Vitamin and Mineral Content of Flours*

	Whole Wheat Flour, Mg./Lb.	White Flour, Mg./Lb.	Enriched Flour, Mg./Lb.
Thiamine	2.20	0.35	1.66
Riboflavin	0.50	0.15	1.20*
Nicotinic acid	25.00	3.50	6.00
Iron	18.00	3.00	6.00
Pantothenic acid	6.50	2.50	
Pyridoxine	2.15	1.12	

* Requirement suspended at present.

11. Rubner, M.: Die Verdaulichkeit von Weizenbrot, Arch. f. Anat. u. Physiol., 1916, p. 61.

12. Murlin, J. R.; Marshall, Margaret E., and Kochakian, C. D.: Digestibility and Biological Value of Whole Wheat Breads as Compared with White Bread, J. Nutrition **22:** 573 (Dec.) 1941. Sealock, R. R.; Basinski, D. H., and Murlin, J. R.: Apparent Digestibility of Carbohydrates, Fats and "Indigestible Residue" in Whole Wheat and White Breads, ibid. **22:** 589 (Dec.) 1941.

13. Aughey, Elizabeth, and Daniel, Esther P.: Effect of Cooking on the Thiamine Content of Foods, J. Nutrition **19:** 285 (March) 1940.

14. Andrews, J. S.; Boyd, H. M., and Terry, D. E.: The Riboflavin Content of Cereal Grains and Bread and Its Distribution in Products of Wheat Milling, Cereal Chem. **19:** 55 (Jan.) 1942.

It seems probable that most of the vitamin content here represented remains in the cereal after milling.

Oatmeal is a rich source of iron (5.2 mg. per hundred grams) and copper (7.38 parts per million). Its phosphorus content, 66 per cent of which is in the form of phytin, is similar to that of whole wheat.

Rice.—Rice supplies slightly more than 1 per cent of the calories of the average American diet, the annual per capita consumption being approximately 5 pounds (2 Kg.). White, or milled, rice, the form in which most of the consumption occurs, is essentially an energy food. The protein content is around 7.5 per cent, thus being lower than that of corn. Over 50 per cent of the minerals and 85 per cent of the thiamine of the entire kernel are lost in milling. In contrast, brown rice, the product that results when only the hull is removed, contains 0.7 to 0.9 mg. of thiamine per hundred grams. It is nutritionally superior in other respects also. A change from white to brown rice would certainly be in the interests of better nutrition.

Rye.—The consumption of rye, mostly as milled rye flour in bread, is less than 3 pounds (1.3 Kg.) per capita annually. This flour is similar to white wheat flour in energy and in protein content. While the whole grain contains approximately 5 micrograms of thiamine per gram on the average, most of it is removed in milling. Minerals are largely removed also. Thus rye flour appears to be similar to white wheat flour in general nutritive value.

Barley.—A small amount of barley is consumed as pearl barley and as barley flour for infant feeding. These are milled products which are apparently similar to white wheat flour in energy value but lower in protein content. Milling has removed minerals and vitamins to an extent similar to that in which it removes them from wheat.

LEGUMES AND NUTS

Dry legume seeds, such as beans, peas and lentils, are approximately twice as rich in protein as the cereals. While legume protein is of rather low biologic value when fed alone, its deficiencies are made up by other proteins in a mixed diet. Dried beans, either home cooked or canned, are noteworthy as a cheap source of protein even though the digestibility is somewhat less than for protein from many other sources.

Dried navy and kidney beans, green or dried lima beans, green or dried peas, lentils and cow peas are all rich sources of thiamine, containing around 0.5 mg. per hundred grams of the dried seed. A part of this thiamine is lost, however, in the cooking process. Two-thirds cup of baked, canned beans should nevertheless supply one eighth of the day's thiamine requirement. These legumes also supply significant amounts of riboflavin. Fresh green lima beans and peas are rich in ascorbic acid, but a large loss is involved in cooking. The legume seeds are noteworthy also for their iron content, the dried products containing from 6 to 10 mg. per hundred grams. Two-thirds cup of baked beans will supply one-fourth the daily adult allowance. Legume seeds are notably higher in calcium and in phosphorus than are even the whole cereal seeds.

It is evident that a larger consumption of dried legumes, particularly in place of refined cereals, would improve the diet in several respects Their cheapness commends them especially for use in low cost diets.

Green and yellow string and wax beans, classed as seed pods, are comparable to the legume seeds in protein, minerals and thiamine per unit of dry matter and in addition contain notable amounts of vitamin A, riboflavin and ascorbic acid.

Peanuts have nutritive values similar to those of the legume seeds previously mentioned and in addition contain vitamin A as well as a much higher energy value. Peanut butter has a nutritive value similar to that of peanuts. Soy beans are apparently nutritionally similar to peanuts, though they are little used as human food. Walnuts are comparable to peanuts in thiamine content, but almonds and pecans have somewhat less. All three have a high fat and a high protein content and are comparable to peanuts as sources of calcium and phosphorus.

VEGETABLES

Under the heading "Vegetables" are grouped a great variety of foods which differ widely in their nutritive values.

Potatoes.—According to United States Department of Agriculture statistics, 305,200,000 bushels of white or Irish potatoes were consumed in the United States in 1939, or approximately 138 pounds (63 Kg.) per capita. Thus potatoes provide approximately 4 per cent of the total calory needs on the average. For many people, however, particularly the lower income groups, potatoes make up a much larger part of the diet than this average figure indicates, and their nutritive value is of added concern accordingly.

Potatoes are primarily an energy food, consisting largely of starch. Approximately 10 per cent of the total calories are in the form of protein of good biologic value. The potato is low in fiber, and according to various investigators it is highly digestible (92 to 99 per cent being used). It is a significant source of iron, in that one medium-sized potato provides approximately one-tenth the daily requirement.

As harvested, potatoes contain 20 to 35 mg. of ascorbic acid per hundred grams and thus provide a substantial amount of this vitamin. There is a continuous loss in storage, however, which amounts to 50 to 70 per cent in twelve months. The initial loss is rapid. There is a further loss in cooking, ranging from 9 to 24 per cent according to the procedure, as reported by Rolf.[15]

The thiamine content of the potato ranges from 95 to 165 micrograms per hundred grams, which would mean from 8 to 14 per cent of the adult daily requirement in a 150 Gm. serving (approximately the average daily consumption) if it were not for cooking losses. The potato does not supply a significant amount of riboflavin. There is evidence that the mineral and vitamin content of the potato is richest just under the skin. Thus cooking in the skin means less loss because the skin is removed with less adhering flesh after cooking and because there is less opportunity for solution losses, such as occur in boiling.

The consumption of sweet potatoes in pounds is only about 25 per cent that of the white variety previously discussed, but it is approximately 35 per cent in terms of calories, owing to the higher dry matter content of the sweet variety. Like the white, the sweet potato is primarily an energy food, low in fiber and highly digestible. Only 6 per cent of the total calories are in the form of protein, as compared with 10 per cent for the white variety.

15. Rolf, Lydia A.: The Effect of Cooking and Storage on the Ascorbic Acid Content of Potatoes, J. Agr. Sc. **61**: 381 (Sept.) 1940.

Sweet potatoes are especially noteworthy, however, for their vitamin A value. Booher [16] gives a value of 3,460 international units per hundred grams of the cooked product. Thus an average sized serving would supply two-thirds the adult daily allowance of 5,000 international units.[17] Sweet potatoes are apparently similar to white in vitamin C content but lower in thiamine. They are also lower in iron and make no significant contribution to the diet as regards other minerals, except possibly in certain trace elements. An excellent study of the nutritive value of dehydrated sweet potatoes has recently been published by Lease and Mitchell.[18]

Other Root Crops.—Among other root crops, the carrot is outstanding in nutritive value because of its high carotene content, which ranges from 2,200 to 10,000 international units per hundred grams. Approximately three-fourths cup of cooked carrots furnishes one-third to three-fourths the daily adult requirement. Compared with potatoes, calory for calory, carrots furnish slightly more protein, iron and thiamine, seven times as much calcium, three times as much riboflavin and somewhat less vitamin C.

Compared with the carrot on a calory basis, turnips furnish similar amounts of thiamine, riboflavin, iron and protein, 50 per cent more calcium and eight times as much vitamin C. Swede juice has been reported one-half as rich as orange juice. One-half cup of properly cooked turnips should supply approximately one-fifth the adult daily allowance of ascorbic acid. Beets are similar to carrots as regards riboflavin and vitamin C content and contain more iron and protein. Raw onions are also a good source of vitamin C according to Murphy,[19] but storage losses range from 14 to 50 per cent, and thus old onions are not a reliable source.

Tomatoes.—Tomatoes are one of the most important protective foods, both because of their special nutritive values and because of their widespread production. They rank third in quantity among the vegetable crops, being exceeded only by white and sweet potatoes. Among the canned vegetables, the tomato in its various forms ranks first.

Tomatoes are outstanding as a source of ascorbic acid, having an average content of 25 mg. per hundred grams for the summer grown products. Thus one small tomato will supply about one-third the recommended daily allowance for the adult (75 mg.). The acidity of the tomato protects it against any considerable loss in cooking unless soda is used in the process. In the canning of tomatoes and tomato juice there is little loss of the vitamin if the process is properly carried out. One 5 ounce (150 cc.) glass of tomato juice supplies about one-third the daily allowance. Recent evidence indicates that tomatoes as purchased on the northern markets in winter contain much less ascorbic acid than those available in summer.

Tomatoes are also rich in carotene. Ripe tomatoes, fresh or canned, contain approximately 1,000 international units of vitamin A per hundred grams. This means that one small tomato or a 5 ounce glass of canned juice will supply about one-fifth the daily adult allowance.

On the basis of the available figures, tomatoes in the amounts consumed cannot be considered as an important source of any of the B group of vitamins or of the mineral elements with the possible exception of iron.

Leafy Vegetables.—The leafy vegetables, including cabbage, kale, chard, broccoli, spinach, turnip greens, collards, lettuce and beet greens, are outstanding sources of certain minerals and vitamins. They are particularly noteworthy for their calcium, the important element in which cereals, potatoes and most other foods except milk and cheese are deficient. Among the leafy vegetables mentioned, turnip greens rank at the top in calcium content. One-half cup (3 ounces, or 90 cc.) of the cooked greens will supply approximately one-third the daily adult allowance. Broccoli, collards, kale, loose leaf lettuce and mustard greens are also rich sources. Head lettuce and cabbage are relatively low, but cabbage greens and the outer leaves of cabbage rank even higher than turnip greens.

Experiments by Fincke [20] have shown that the calcium content of broccoli and that of cauliflower are nearly as available as that of milk. Speirs [21] has reported that the utilization of calcium from turnip greens is about equal to that from milk but that the calcium in tender greens, collards and kale is less well utilized. The calcium of spinach, beet greens, chard and lamb's-quarters is not nutritionally available because of the high oxalic content of these vegetables.

The calcium contribution of green leafy vegetables becomes particularly important in diets containing little milk or cheese.

The green leafy vegetables are important sources of iron. A serving (3 ounces) of cooked turnip greens, mustard greens, spinach, chard or beet greens will supply approximately 25 per cent of the adult daily allowance. Kale supplies somewhat less, and headed lettuce and cabbage are relatively poor sources.

The green leafy vegetables are all rich sources of carotene and thus make an important contribution to the vitamin A content of the diet. Sherman [22] gave a range of 13,000 to 27,000 international units per hundred grams for kale, chard, spinach, turnip greens, dandelion greens and mustard greens. The greener and leafier the product, the higher is the vitamin A content. Allowing for losses in cooking and for the fact that the vitamin allowance must be higher when carotene is the source, a 3 ounce serving of one of these greens can be relied on to meet more than the day's needs. Headed cabbage and lettuce are relatively poor sources.

In the fresh state, the leafy vegetables are excellent sources of vitamin C. A cup of raw shredded cabbage will furnish nearly a third of the day's allowance. Watercress, collards, broccoli, turnip greens, mustard greens and kale are similar in vitamin C content to cabbage; beet greens and dandelion greens contain somewhat less; lettuce, escarole and endive contain much less. Leafy vegetables lose vitamin C by oxidation in storage and also in cooking. Further losses occur

16. Booher, Lela E., and Marsh, R. L.: The Vitamin A Values of 128 Foods as Determined by the Rat Growth Method, Tech. Bull. 802, United States Department of Agriculture, December 1941.

17. In setting up this allowance, it was recognized that somewhat more would be required if all the units were furnished as carotene and somewhat less if all were furnished by vitamin A itself, because a unit in the form of carotene may be, under certain conditions at least, only about half as effective in human nutrition as a unit of vitamin A itself. Thus, the rating here given for sweet potatoes, while accurate for comparison with other plant sources of vitamin A, overrates the vegetable in comparison with a source of vitamin A itself. The same considerations apply to later discussions of the vitamin A value of the foods included in this paper.

18. Lease, E. J., and Mitchell, J. H.: Biochemical and Nutritional Studies of Dehydrated Sweet Potato, Bull. 329, South Carolina Agricultural Experiment Station, June 1940.

19. Murphy, E. F.: Ascorbic Acid Content of Onions and Observations on Its Distribution, Food Research **6**: 581 (Nov.-Dec.) 1941.

20. Fincke, M. L.: The Utilization of the Calcium of Cauliflower and Broccoli, J. Nutrition **22**: 477 (Nov.) 1941.

21. Speirs, Mary: The Utilization of Calcium in Various Greenes, J. Nutrition **17**: 557 (June) 1939.

22. Sherman, H. C.: Chemistry of Foods and Nutrition, ed. 2, New York, Macmillan Company, 1941.

by solution in cooking if the cooking water is discarded. Gould, Tressler and King [23] found that, in cooking, 25 per cent of the vitamin C of cabbage was destroyed by oxidation and another 25 per cent lost in the cooking water. Other vegetables have shown similar losses. In the preparation of vegetables, further destruction of vitamin C by oxidation occurs when they are crushed or bruised, cut or chopped into small pieces or allowed to stand for long periods at room temperature both before and after cooking. Vitamin C losses can be decreased by refrigerating the vegetable until ready to prepare and serve, by using boiling water to start the cooking process and by using as small an amount of water in cooking as possible. The same methods which help to conserve the vitamin C value will also conserve riboflavin, thiamine and mineral values. All these food components are more or less water soluble.

Most of the green leafy vegetables are excellent sources of riboflavin, the leaves being much richer than the stems. A serving of cooked turnip or beet greens will supply nearly 25 per cent of the adult daily allowance. Spinach, kale, broccoli and collards supply about half as much, on the average. Headed cabbage and lettuce rank at the bottom of the list. Although the leafy vegetables contain several times the amount of thiamine required to metabolize their digestible calories, none of them can be ranked as rich sources of this vitamin. A serving of the better ones in this respect should supply on the average about one-tenth the day's allowance. The destruction in cooking usually does not exceed 10 to 15 per cent, but the addition of soda increases destruction, and when large amounts of water are used and discarded, large additional losses occur by solution. Certain leafy vegetables have been found effective in preventing and curing pellagra, but there are practically no data available regarding their specific nicotinic acid content.

In the amounts commonly consumed, leafy vegetables are of little significance as energy foods, but their higher carbohydrate content provides roughage, which is needed in certain diets. They are relatively richer in protein than in calories, and their protein ranks above seed proteins in general in biologic value. However, the actual contribution to the diet in the amounts commonly consumed is small.

Miscellaneous Vegetables.—There are several other vegetables which, although limited as to general use, make important contributions to the diet of certain groups. The Hubbard, or winter, variety of yellow squash contains 6,000 international units of vitamin A per hundred grams. One-half cup of the cooked product supplies nearly one-half the adult daily allowance. Summer squash contains much less. Pumpkin furnishes approximately two-thirds as much as winter squash.

A serving of fresh asparagus (nonbleached) can furnish approximately one-fifth the day's allowance of vitamin A and one-sixth that of vitamin C. It is also a significant source of calcium and iron. Brussels sprouts are rich sources of vitamin C and also furnish significant amounts of iron, calcium and vitamin A. Cauliflower is notable for its content of ascorbic acid, thiamine and riboflavin.

One medium sized sweet pepper will furnish 460 international units of vitamin A and 180 to 200 mg. of vitamin C. Chili peppers, whether fresh or dried, are a good source of vitamin A. Fresh chili is an excellent source of vitamin C. Some of the vitamin C is retained on canning. Okra contains 2,380 international units of vitamin A per hundred grams. Parsley, which is used mainly for decoration, is an excellent source of both vitamin A and iron. When fresh it furnishes some vitamin C.

FRUITS

According to United States Department of Agriculture statistics for 1939, the present per capita consumption of fruits, calculated on the fresh basis, was 221 pounds (100 Kg.). Of this total, 75 per cent was consumed fresh and 15 per cent canned, and the remainder was divided between dried fruits and juices. Apples outranked all other fruits, representing over one-fourth the total consumption. But citrus fruits as a class exceeded apples by 50 per cent or more. The nutritive values of various fruits have been excellently summarized in a recent article by Morgan,[24] and I have drawn on this article for many of the data which follow.

Fruits do not contribute important amounts of either calories or proteins to the diet, but they are of outstanding value because of their content of certain vitamins and minerals. As a class, fruits are important sources of ascorbic acid, certain members of the B complex, vitamin A, iron and other minerals, but there is a large variation among the different kinds as regards the extent of their contributions.

The citrus fruits are especially important for their ascorbic acid content. A medium-sized orange weighing around 5½ ounces (155 Gm.) will meet the daily adult allowance. A somewhat greater weight of grapefruit is required. Four and one-half ounces (130 Gm.) of canned orange or lemon juice or 6 ounces (170 Gm.) of canned grapefruit juice would supply the daily allowance. While the citrus fruits cannot be considered important sources of other nutrients, they do contain iron, calcium and thiamine in amounts which are of some significance in the diet. Pineapples, which are consumed mostly canned or as juice, contain about half as much vitamin C as do citrus fruits and are in general similar in other values.

Apricots and yellow peaches are important sources of vitamin A. The day's adult allowance is supplied by 3½ ounces (100 Gm.) of fresh or canned apricots or by approximately three times as much fresh or canned peaches. Weight for weight, dried peaches and dried apricots supply approximately three times as much vitamin A as the fresh products. Canteloupes contain about half as much of this vitamin as do fresh peaches, and they are an important source of ascorbic acid. Dried prunes furnish significant amounts of vitamin A, riboflavin and thiamine. Plums rank above other fresh fruits in thiamine content. Apricots, peaches and to a lesser extent prunes are significant sources of iron.

Apples cannot be considered a large source of any vitamin or mineral nutrient. In view of their large consumption, however, they do make a significant contribution of ascorbic acid to the diet. A medium sized apple weighing 6 ounces supplies on the average about one-sixth the day's allowance, but there are decided differences among varieties. The keeping qualities of apples make it possible for them to be marketed throughout the winter in latitudes where fresh grown sources of vitamins are unavailable or high in price. In rural areas in which they are produced, home stored apples undoubtedly make an important contribution of

23. Gould, Stella; Tressler, D. K., and King, C. G.: Vitamin C Content of Vegetables: V. Cabbage, Food Research **1**: 427 (Sept.-Oct.) 1936.

24. Morgan, A. F.: A Nutritive Index of Fruits, Fruit Products J. **21**: 75 (Nov.) 1941.

ascorbic acid to the diet during the winter season, when the problem of getting adequate supplies of this vitamin is most difficult. Apples also contain a significant amount of iron. There is a 25 per cent loss of vitamin C in making applesauce. The loss is greater when apples are baked or made into pie.

Bananas are similar to apples in vitamin C value: they contain almost twice the iron. Bananas are a significant source of vitamin A.

SUGAR, SYRUPS AND MOLASSES

White sugar contributes only calories to the diet. It is clear that the present large consumption of sugar is disadvantageous in that it means a smaller consumption of nutritionally superior foods. Furthermore, there is evidence that sugar is a factor in tooth decay. Brown sugar, corn syrup, honey, maple syrup and maple sugar contain small amounts of calcium and iron. Molasses is an excellent source of both, 1½ tablespoons furnishing approximately one-tenth the estimated daily adult allowance of calcium and one-fifth the estimated daily adult need of iron. Sorghum supplies a lesser amount of calcium and about an equal amount of iron. Table blend syrups contain a significant but lesser amount of iron.

VEGETABLE OILS

Cottonseed, corn, soybean, peanut and olive oils and in lesser amounts other vegetable oils are consumed as shortenings, salad oils and margarines. The oils as such are sources only of energy. Many oleomargarines are now fortified with 9,000 international units of vitamin A per pound; they also supply some vitamin D.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

AUSTIN E. SMITH, M.D., Acting Secretary.

ALUMINUM PHOSPHATE GEL.—An aqueous suspension containing not less than 3.8 per cent nor more than 4.2 per cent of aluminum phosphate ($AlPO_4$). Flavoring, sweetening and preservatives may be added.

Actions and Uses.—Aluminum phosphate gel has antacid, astringent and demulcent properties analogous to those of aluminum hydroxide gel but does not interfere with phosphate absorption. Because the acid combining power of aluminum phosphate gel is less than one half that of aluminum hydroxide gel of the same concentration, claims that it possesses advantages over the latter preparation in the treatment of peptic ulcer are not permissible except when the ulcer is associated with a relative or absolute deficiency of pancreatic juice, diarrhea or low phosphorus diet. The evidence indicates that, despite its lower combining power, aluminum phosphate gel therapy gives as good results in the treatment of peptic ulcer, but for the present its use should be restricted to patients under conditions or with complications likely to produce phosphorus deficiency.

Dosage.—Fifteen to 30 cc. (1 to 2 tablespoons) alone or with water or milk may be administered every two hours during the active stage of the ulcer. Later the dose may be reduced to 45 cc. (3 tablespoons) four times daily (with or after each meal and at bedtime) or to 30 cc. (2 tablespoons) six times daily (with or after and between meals and at bedtime).

Tests and Standards.—

Aluminum phosphate gel occurs as a white, odorless suspension which may settle out to some extent on standing. Its specific gravity at 25 C. is from 1.032 to 1.044. The *p*H at 25 C. of aluminum phosphate gel is between 6.0 and 7.2.

Dilute 1 Gm. of aluminum phosphate gel to 100 cc. and mix. To 5 cc. of the diluted gel add 1 cc. of sodium hydroxide solution, 1 cc. of 1 per cent alcoholic alizarin sulfonate solution and neutralize with 36 per cent acetic acid: a flocculent red precipitate appears. To another 5 cc. portion of the diluted gel add 2 cc. of dilute nitric acid and 2 cc. of ammonium molybdate solution: a yellow precipitate appears which dissolves in sodium hydroxide solution to yield a colorless solution. Add 30 cc. of tenth-normal hydrochloric acid to 6 Gm. of aluminum phosphate gel and digest at 37 C. for fifteen minutes: the *p*H of the mixture lies between 2.0 and 2.5.

Transfer 5 Gm. of aluminum phosphate gel to a glass container, add 10 cc. of diluted hydrochloric acid and agitate: the mixture yields a clear and colorless solution within ten minutes; to this solution add 8 cc. of ammonia water: a flocculent precipitate appears which is insoluble in excess ammonia water but soluble in sodium hydroxide solution.

Dissolve 10 Gm. of aluminum phosphate gel in 10 cc. of diluted hydrochloric acid and boil. Cool, dilute to 250 cc. and filter if necessary. To 10 cc. add 1 cc. of barium chloride solution and allow to stand for ten minutes: the turbidity is not greater than that produced by 0.2 cc. of fiftieth-normal sulfuric acid in 10 cc. of water. Dissolve 2.5 Gm. of the gel in 5 cc. of diluted sulfuric acid and boil: the solution meets the U. S. P. test for arsenic. Dissolve 10 Gm. of aluminum phosphate gel in 10 cc. of diluted sulfuric acid: the resultant solution conforms to the U. S. P. test for heavy metals.

Transfer 25 cc. of aluminum phosphate gel to a beaker, add 5 cc. of nitric acid, 50 cc. of distilled water and 40 cc. of tenth-normal silver nitrate solution. Mix thoroughly, digest, filter and wash the precipitate and titrate the filtrate with tenth-normal ammonium thiocyanate solution, using ferric ammonium sulfate as indicator: the chloride content does not exceed 0.15 per cent. Filter sufficient gel to yield 100 cc. of filtrate. To 50 cc. of the filtrate in a 250 cc. beaker add 2 cc. of nitric acid and 20 cc. of ammonium molybdate solution. Digest on the steam bath for one hour, filter and wash the precipitate with 2 per cent nitric acid, followed by washing with 1 per cent potassium nitrate solution until the filtrate is no longer acid. Dissolve the precipitate in excess tenth-normal sodium hydroxide solution and titrate the excess alkali with tenth-normal hydrochloric acid using phenolphthalein. Each cubic centimeter of tenth-normal sodium hydroxide is equivalent to 0.309 mg. P_2O_5. The soluble phosphate, calculated as P_2O_5, is not greater than 0.05 per cent. To a portion of aluminum phosphate gel weighing about 0.3 Gm., accurately weighed, add a drop of 2 per cent alcoholic thymol blue, 30 cc. of tenth-normal hydrochloric acid and digest at 37 C. for thirty minutes. Titrate with tenth-normal sodium hydroxide and compare with an indicator solution adjusted to *p*H 2.5. Each gram of the gel requires no less than 5 nor more than 9 cc. of tenth-normal hydrochloric acid. Transfer about 20 Gm. of aluminum phosphate gel, accurately weighed, to a 100 cc. volumetric flask, add nitric acid until solution is complete, and dilute to the mark. Mix thoroughly, transfer 10 cc. to a 400 cc. beaker, dilute to 100 cc., warm to 80 C.; add an excess of ammonium molybdate solution and digest on the steam bath for one hour. Filter and wash the precipitate with 2 per cent nitric acid, followed by 1 per cent potassium nitrate solution until the filtrate is no longer acid. Dissolve the precipitate in one-half normal sodium hydroxide and titrate with one-half normal acid, using phenolphthalein as the indicator. Each cubic centimeter of one-half normal sodium hydroxide is equivalent to 2.654 mg. of $AlPO_4$. The calculated aluminum phosphate content is no less than 3.8 nor more than 4.2 per cent.

JOHN WYETH & BROTHER, INC., PHILADELPHIA.

Phosphaljel: 12 fluidounce bottle. Aluminum phosphate gel containing 4 per cent of aluminum phosphate, 5 per cent of glycerin, not more than 0.5 per cent of sodium benzoate as a preservative and oil of peppermint as a flavoring agent.

Council on Foods and Nutrition

ACCEPTED FOODS

THE FOLLOWING ADDITIONAL FOODS HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO ACCEPTED FOODS.

FRANKLIN C. BING, Secretary.

FRUIT JUICES INCLUDING TOMATO JUICE (*See* Accepted Foods, 1939, p. 48).

National Fruit Product Company, Winchester, Va.

WHITE HOUSE APPLE JUICE, a pasteurized sweet apple juice.

Analysis (submitted by manufacturer).—Moisture 86.6%, total solids 13.4%, ash 0.3%, fat 0.25%, protein 0.3%, invert sugars 10.5%, sucrose 1.2%, acid 0.35%. Analytic data furnished by the firm show that the copper, arsenic and lead content of this product are well within the tolerances for these substances adopted by the Council.

Calories.—0.5 per gram; 14 per ounce.

PREPARATIONS USED IN THE FEEDING OF INFANTS (*See* Accepted Foods, 1939, p. 156).

Gerber Products Co., Fremont, Mich.

GERBER'S STRAINED PEACHES, canned cooked Michigan peaches, sugar and water.

Anaylsis (submitted by manufacturer)—Moisture 79.8%, protein (N × 6.25) 0.6%, fat 0.9%, crude fiber 0.9%, ash 0.3%, carbohydrates (other than crude fiber) by difference 17.5%, calcium as Ca 0.007%, phosphorus as P 0.015%, iron as Fe 0.0005%.

Calories.—0.8 per gram; 22.86 per ounce.

Vitamins.—Vitamin A: 1,020 U. S. P. units per hundred grams; thiamine: 0.1 mg. per hundred grams; ascorbic acid: 2.8 mg. per hundred grams.

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SATURDAY, OCTOBER 31, 1942

FATIGUE AND WORKING CONDITIONS

Mechanization, speeding of industrial processes and mass production as a part of the war effort have combined to present new problems of industrial health. The illnesses of the workers, their accident rates and their industrial output have been shown to be closely related to fatigue. Physical fatigue, according to Sayers,[1] who reviewed this subject recently in *War Medicine*, may be temporary, subacute or chronic. Temporary fatigue is a normal feeling of tiredness that passes away after a short rest and allows resumption of original work without decrease in efficiency. Subacute fatigue may result from continued activity at the same intensity until energy reserves are depleted. This condition, if unchecked, may become chronic. Chronic fatigue, the final stage of a series of events which begins with overwork, may end in disabling illness. Fatigue may be local or general. Local fatigue affects particularly the muscles that have been employed most actively. General fatigue affects the whole body and frequently results from such conditions of work as excessive hours, curtailed periods of rest and insanitary, uncomfortable or hazardous surroundings. Any type of chronic fatigue may affect the health or liability to accidents of workers and consequently volume or quality of plant output as well.

Accurate knowledge of optimum working conditions is therefore important to the health of workers and ultimately to the production problem. Obviously the circumstances leading to fatigue and the methods of preventing fatigue will vary from industry to industry and will depend on the type of activity actually carried out by the individual worker. There will also be variation between what a worker can do safely for short periods of time as contrasted with prolonged effort. Nevertheless there are certain general principles, reviewed by Sayers, which are applicable to practically all industries. A final answer cannot be given to the question "What is the optimum number of hours of work?" Within limitations, reduction in hours of work leads to a decrease in accidents, spoiled work, sickness and absenteeism. Likewise there is such an increase in hourly output that daily output also increases. In one large factory where weekly hours were first 74.5, then 63.5 and later 55.5, speed of production increased after each reduction. Similar observations have been made elsewhere. In an American munitions plant the hourly output fell by 6.5 per cent when 2.66 hours of overtime was added to the normal ten hour day. Sayers cites Knight, who concluded that the reduction of working hours from twelve to ten leads to an increase in hourly and daily output; the reduction of working hours from ten to eight leads to a further increase in hourly and daily output, except in operations whose speed depends mainly on the speed of machines. Finally reduction of working hours below eight, although increasing hourly output, does not usually lead to an increase in daily output.

The published experience in both Germany and Great Britain, where hours of labor were generally increased during the early phases of the war, indicate that ten hours a day is the maximum number which can be worked with reasonable efficiency. In a speech to the House of Commons on July 29, 1941 Prime Minister Churchill summarized this view when he said "If we are to win this war . . . it will be largely by staying power. For that purpose there must be one day in seven for rest as a general rule and there must be one week's holiday a year."

The experience of Jokl, Chiver and their colleagues of South Africa in training recruits who were substandard mentally and physically, cited by Sayers, is also applicable to this problem. From 1932 to 1939 nearly fourteen thousand boys between the ages of 16 and 21 who were unable to find employment were recruited for physical training. After first finding the physical training strenuous they changed their attitude and came to like the exercise; their physical efficiency and resistance to fatigue were remarkably improved. This may be considered as corroborative of the well known fact that physical training for any particular activity increases the ease with which that activity is done and decreases the likelihood of fatigue. Physical training may reduce liability to fatigue to such an extent that hours of work can actually be increased with safety.

The information already available on this subject, when applied to individual industries and whenever possible to individual procedures within those industries, should be used to attain maximum output without resultant fatigue to the workers.

1. Sayers, R. R.: Major Studies of Fatigue, War Medicine **2**: 786 (Sept.) 1942.

RECENT TRIBUTES TO PHYSICIANS

Three notable tributes have been paid recently to the services of the medical profession in time of war. One of these was by a Washington columnist, another by a well known radio commentator and the third by a famous newspaper cartoonist.

In his column "In the Capital" Ernest Lindley,[1] discussing manpower control, cited the medical profession as an example of the trial of voluntary allocations before proceeding to compulsory methods. Mr. Lindley tells how the medical profession has succeeded in supplying doctors to the armed forces:

> Supplying the armed services with medical officers has provided an interesting test. A few months ago the prospective shortage of physicians in the Army was serious. The job of overcoming this was undertaken by the War Manpower Commission with the cooperation of the American Medical Association and its state and local affiliates. A roster of 176,000 licensed physicians was available from which to draw the military quota of 42,000 for 1942, while preserving as far as possible an even distribution of medical care for the civilian population.
>
> This recruitment is still in process. With the year almost three fourths gone, five sixths of the quota has been filled. State and local medical groups have stood watch against dangerous depletion, and, on the whole, the authorities report, an overall balance of medical care has been preserved.
>
> Recently, however, a survey showed that 300 war boom towns lack adequate medical staffs. The American Medical Association approved experiment with three alternative plans for supplying this need: payment of moving expenses to volunteer doctors, federal salaries to supplement their fees and the temporary commissioning of doctors in the Public Health Service.

Deems Taylor,[2] well known musical and radio commentator, paid a tribute to the medical profession over the Columbia Broadcasting System on Sunday, September 20. The following are excerpts from Mr. Taylor's broadcast, minus the music and dramatic presentation, which greatly enhanced its effectiveness:

1. Chicago Sun, September 24, p. 11.
2. "The Family Hour," Prudential Insurance Company of America, Station WABC, 5-5:45 p. m., September 20.

We come now to that special feature of the Prudential Family Hour "So Proudly We Hail," in which we pay tribute to the men, the nations and the services that are in the forefront of our fight for freedom. Today So Proudly We Hail the United States Army Medical Corps.

Yes, the medical men are here and ready—they were at Pearl Harbor. And we know now of the wonderful work they did in caring for the wounded. They were there as they have always been in every national emergency. As they were in 1775 when the Medical Corps was first organized. It was during the siege of Boston that the Second Provincial Congress passed an act providing two surgeons and two surgeons' mates to a hospital. In the lull between the battles of our first fight for freedom the men of the Continental Army wondered about the new act: "What'll the doctors do? What are their duties?

Well, the act of Congress says that the doctors must see that our wounded have plenty of fresh, clean straw to lie on.

There was little more than that expected from our first medical corps, but the men of medicine had ideas of their own. From this humble beginning they've built the greatest medical service in the world. Today they maintain a chain of top notch military hospitals costing well over a hundred and sixty-five million dollars. It was an American surgeon, Jonathan Letterman, who during the Civil War devised the method for evacuating field casualties that has become the basic pattern of all big warring powers today. Through their skill and devotion the medical men of 1942 have created the healthiest army in the entire world. They have brought their talents to the Colors from every town and hamlet in the land. They are the men whose prescriptions were filled in corner drug stores. They are the men who from the sickrooms of America heard the call of American wounded in far off places. They are men like—well, say Dr. Thomas Thurston of a little town in the Midwest.

Cartoon by Vaughn Shoemaker, reproduced from the Chicago Daily News of October 10.

Here followed an interlude of drama between Dr. Thurston and little Mary, his patient, who insists she doesn't want any other doctor but who finally is persuaded that his duty lies to many other patients who wear the uniform of the United States armed forces.

Dr. Thurston is Lieutenant Thurston of the United States Army Medical Corps now. Like thousands of his brother physicians he heard and answered the call. A cherished career and the practice built through many trying years set aside, with never a thought of anything but the service that lies ahead. Maybe little Mary will have her Dr. Thurston again. Maybe not. For physicians die in battle too. They die so that others

may live. It's a long way from the bedside of a little girl in the Middle West to a battle salient somewhere on Bataan. Yet the men who carried their little black medical bags into houses on Main streets were the same men who carried the comfort of the Medical Corps to the fox holes where our liberties were first challenged.

The cartoon by Vaughn Shoemaker of the Chicago *Daily News*, which appeared Saturday, October 10, showed a bearded old fashioned doctor, too old for service, in his office beyond a waiting room filled with patients. The cartoon speaks for itself, telling better than many paragraphs the burdens now resting on America's family doctors.

Current Comment

HEALTH NEWS BROADCASTS BY PROVIDENCE MEDICAL ASSOCIATION

"Health in the News" [1] is the title of an interesting series of news broadcasts presented between Oct. 31, 1941 and July 29, 1942 over radio station WEAN, Providence, R. I. Prepared and presented by its executive secretary, the broadcasts were made under the auspices of the Providence Medical Association. They have been broadcast at various times of day including choice evening hours between 7 and 9 o'clock Fridays. These broadcasts are notable for the wide range of their topics. In one broadcast, for example, is the story of the discovery of Ras Nefer, the oldest Egyptian mummy in the world, followed immediately by an item headed "School Days for Your Doctor" and descriptive of the Boston meeting of the American College of Surgeons plus a reference to the forthcoming scientific meeting of the Providence Medical Association. This is followed by a sports item dealing with Fred Hutchinson and Bob Feller, baseball pitchers now enlisted in the United States armed forces. The tie-up with medicine was the fact that Hutchinson is the son of a Seattle obstetrician and that a cast of Bob Feller's hand by sculptor Joseph Motto is a part of the exhibit of men's hands in the Cleveland Museum of Health. Immediately following this is a historical reference to René Laënnec; this is associated with the use of stethoscopes to diagnose whether Nazi delayed action bombs remain alive or dead. In the same news broadcast is a postage stamp collectors' item having to do with efforts to issue a United States postage cancer control stamp. Then appears a reference to Mother Hubbard, intimating that in Bay City, Mich., she can no longer go to the grocery store with her dog because of a new sanitary ordinance. News of strikes and walkouts includes a story of one which was responsible for canceling the meeting of the Pennsylvania State Medical Society, thus depriving doctors of some valuable scientific opportunities. The broadcast closed with a reference to a *Hygeia* article on why babies smile; this item closed on the semihumorous personal note "I shall continue to delude myself that my Linda Ann really thought my antics worth her smile in the first weeks at our home." This radio program, of which the first broadcast has been described in detail, holds up remarkably well through the long series of weekly broadcasts from October through July with items covering the whole gamut of human interest, world news, tragedy, whimsey and every phase of listener appeal. It bears the evidence of long hours spent in conscientious labor, without which no radio broadcast or other effort in health education could succeed. The fact that a radio station continued to broadcast it regularly during the premium evening hours for which commercial sponsors compete is in itself evidence that it was a distinctly worthwhile program for all persons concerned, especially in wartime. It was good for the medical society because it interpreted Rhode Island physicians to the people. It was good for the radio station because it provided them with a popular educational public service feature. It was good for the public because it gave them helpful information, medical news and a better understanding of their doctors.

1. Health in the News, prepared and presented by John E. Farrell, Executive Secretary, Providence Medical Association, Providence, R. I., over radio station WEAN (Providence), Oct. 31, 1941-July 29, 1942.

THE PHYSICIAN'S PART IN THE RATIONING OF GASOLINE, TIRES AND FUEL OIL

Under Medicine and the War in this issue of THE JOURNAL appears a letter to physicians of the United States from the chief of the Gasoline Rationing Branch of the Office of Price Administration. It calls on the medical profession not only to comply fully with the actual stipulations relative to the rationing of gasoline and tires but also to go beyond such limitations into the spirit of the effort which is so intimately concerned with the winning of the war. Doctors should adhere religiously to the provisions of the regulations and should set an example to all other persons in the community by the economy with which they use these materials. When Mr. John R. Richards says that doctors are the leaders and molders of public opinion in their communities, he recognizes the dependence of the public on medical leadership in all matters concerned with health. Already such recognition has come from the director of the Fuel Rationing Division. Physicians are authorized to certify invalids, old people and infants for extra fuel oil. Mr. Joel Dean, director of this division, points out that the rationing boards will naturally rely largely on physicians' certification. He says "If these auxiliary rations are granted with unjustified liberality, the effectiveness of the entire effort to distribute this scarce commodity equitably and to assure continuance of oil for industrial processes in war plants will be jeopardized. I am sure that the medical profession, when it realizes the seriousness of this additional responsibility, will discharge it conscientiously and patriotically." The patriotism of the medical profession has never been questioned. In this great war physicians have demonstrated their support by their magnificent enlistment in the armed forces and by assuming innumerable obligations in relationship to the control of civilian life. Let us, by the manner in which we aid in the programs for the rationing of fuel, gasoline and tires, demonstrate again to the people of America that confidence in and dependence on the medical profession is well warranted.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on War Participation of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war and such other information and announcements as will be useful to the medical profession.

GASOLINE AND TIRE RATIONING

AN OPEN LETTER TO THE MEMBERS OF THE AMERICAN MEDICAL ASSOCIATION

In the East Coast Gasoline Rationing program, made necessary by the shortage of transportation facilities for petroleum products, the indispensability of your profession was recognized by its inclusion in the categories of persons eligible for preferred mileage, that is, necessary occupational mileage in excess of 470 miles a month. Now the Office of Price Administration has been ordered by Mr. William Jeffers to institute and administer a nationwide mileage rationing program for the express purpose of conserving our rubber-borne transportation. In framing the Regulations for the new program, your profession was one of the first to be provided for.

If we are to carry out our double task of preventing a collapse of our military and civilian transportation, we must have the complete cooperation of those groups of persons whose driving is deemed essential to the war effort. Our immediate aim is to attain the 5,000 mile national mileage average set by the Baruch Report as the maximum possible in light of the dire rubber shortage. Our experience with the East Coast program tells us that the preferred categories use one half of the gasoline consumed, though they constitute less than one fourth of the total number of automobile operators. Clearly, then, the great savings of rubber on a nationwide scale must be made in the preferred categories.

Under the Regulations, governing the mileage rationing program, physicians are eligible for preferred mileage if their essential occupational needs exceed 470 miles a month and if the mileage is needed for regularly rendering necessary professional services. Mileage traveled daily or periodically between home or lodging and a fixed place of work is not considered preferred. Physicians who conduct their practices in offices, as many specialists do, are not eligible for preferred mileage.

Without question or hesitation, doctors have been and will be granted all the gasoline needed to carry out their professional work. We hope that they will regard their concrete symbol of their indispensability, the C book, as a moral obligation and not as a personal privilege. From another point of view, the C book is part of a doctor's equipment; it should not be used for anything but the work of humanity.

When nationwide gasoline rationing begins, there are certain concrete things a doctor can do to live up to the high ethical standards set for him by his own profession:

1. At the time of first issuance of rations, he can so carefully compute his necessary mileage as to make a B book adequate for his purposes though he might easily make out a case for a C book, which might be granted to him without question by his local War Price and Rationing Board eager to provide for physicians.

2. In the computation of his mileage, he can religiously adhere to the provision of the Regulations, which makes 150 miles of his basic ration available for occupational purposes. Moreover, he can help mightily in establishing the principles that only 90 miles of the basic ration are to be used for home neces-

sity use and that there is no provision whatever in any ration for "pleasure driving."

3. Conversely, if he should be granted a C book, he can return to the local board, at the end of the three months period, all unused coupons accruing to him as a result of a quite natural overestimation of needs or of overgenerous "tailoring" by his board, instead of using such coupons for nonessential purposes. The moral effect of such an act on his fellow citizens will be incalculable.

4. He can set an example by scrupulously observing the 35 mile speed limit, except in cases of emergency, in spite of the fact that doctors could easily "get away with it."

5. Should he be assigned to a hospital, clinic or institution after a ration card for calling on his private practice has been issued, he can use public means of transportation at the price of personal inconvenience.

6. He can refrain from any kind of driving whatever which might appear to be nonessential in the eyes of the public.

Doctors are the leaders and molders of public opinion in their communities. If the average man has any reason to believe that the professional men whom he regards with great respect are indifferent or hostile to the mileage rationing program, it will be difficult, if not impossible, to make it effective. Conversely, if doctors as a group observe the letter and spirit of the Regulations, they will be a powerful force in making this absolutely mandatory war measure serve its purpose. We know that we can rely on the support of your profession, which has demonstrated its patriotism, ability and unselfishness at every opportunity.

JOHN R. RICHARDS, Chief Gasoline Rationing Branch, Office of Price Administration.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

1942 OBJECTIVE IN PROCUREMENT OF MEDICAL OFFICERS ALMOST REACHED

The directing board of the Procurement and Assignment Service is pleased to announce that 95 per cent of the 1942 procurement objective of medical officers for the armed forces has already been met. Toward this total a number of states have supplied more than their share of physicians and only a few states are lagging behind in their quotas. It is from these states that the additional physicians needed during the current year should come.

The recruitment of such a large number of physicians in a few months is a remarkable achievement and another demonstration of the traditional patriotism and unselfishness of the medical profession. In this achievement, and particularly in its members who are "in service," the profession can justifiably take pride.

The end, of course, is not yet. Increases in the armed forces will necessitate more medical officers, and additional demands will be made on the profession for medical services in critical war production areas. The directing board is convinced, however, that the physicians of this country will respond to future calls for service, whatever they may be, in the same splendid manner with which they have already volunteered for service with the armed forces.

FRANK H. LAHEY, M.D.
HAROLD S. DIEHL, M.D.
HARVEY B. STONE, M.D.
JAMES E. PAULLIN, M.D.
C. WILLARD CAMALIER, D.D.S.

MEDICAL EDUCATION AND THE WAR

The following statement from the directing board of the Procurement and Assignment Service, Washington, D. C., has just been sent to the deans of medical schools:

MEDICAL STUDENTS

Recent information indicates that a relatively large percentage of medical students have failed to join the reserve services of the Army or the Navy. It is urged that every student who has not yet done so should apply immediately for a commission in the Army or the Navy. This will enable medical students to continue their training through one year of internship before they are subject to Selective Service.

INTERNS

Army.—Interns may not enlist in the Medical Administrative Corps Reserve, since this group was organized solely for the purpose of enabling medical students to complete their training. If a student is not a member of the Medical Administrative Corps, he is subject to the jurisdiction of the Selective Service System and may be inducted before he can complete the one year of internship which is required for commission as first lieutenant in the Medical Corps of the Army of the United States. Interns, whether or not they have been in the Medical Administrative Corps Reserve during their attendance at medical school, cannot apply for a commission in the Army Medical Corps until sixty days before the completion of their internships.

Navy.—The Navy will commission interns as lieutenants, junior grade, if they meet the requirements, and it will allow them to complete their internships. We recommend, therefore, that students who contemplate service in the Navy should apply for commissions as ensigns HV (P) in the Navy while they are in medical school.

FACULTIES

It is recommended that deans request faculty members who plan to apply for a commission to discuss the matter with school authorities before making formal application. A physician who

is deemed essential on the faculty of a medical school should not apply for a commission until he has been cleared by the school and by the Procurement and Assignment Service and until arrangements have been made for his replacement.

No physician under 45 years of age, who is physically fit for military service, should be declared essential to a medical school faculty unless he devotes at least 25 per cent of his time throughout the entire year to medical school teaching, clinical as well as formal. Any exception to this policy must be justified by unusual circumstances.

ALIEN PHYSICIANS

The following statement by the directing board of the Procurement and Assignment Service has just been sent to state chairmen for physicians:

The Army and the Navy are not in a position to accept enemy alien physicians as commissioned officers because of the citizenship law. Also many of these physicians do not meet other requirements such as license to practice, internship or other professional qualifications. It therefore seems inadvisable to recommend that these aliens go into the Army as privates with the expectation of receiving citizenship at the end of three months, for many may not receive it for some reason, and they may not be acceptable to the Medical Corps even though they are given citizenship. Since there are many places in which these men can be of service in civilian life, it is recommended that efforts be made to place those who are not acceptable for service with the Army or the Navy as temporary employees in hospital positions, in critical areas where more physicians are needed, in special positions in medical schools, and in public health agencies and so on. In such positions they may be rated as essential and may thus be used in their professional capacity. Until definite rulings are made concerning the admission of this group into the military services, these general policies should be followed.

THE COMMISSIONING OF VETERINARIANS

The directing board of the Procurement and Assignment Service, Washington, D. C., recently requested information from the Surgeon General's Office about its policy concerning the commissioning of doctors of veterinary medicine. It seemed to the board that valuable veterinary manpower was being lost through the induction of veterinarians as enlisted men and their subsequent commissioning through routine military channels.

The board asked the Surgeon General's Office if it would not be possible for veterinarians to apply for commissions on receiving their orders for induction. In reply, the Surgeon General's Office gave the following information:

1. Routine commissioning of additional veterinarians in the Veterinary Corps was suspended two years ago.

2. Veterinarians now commissioned are in excess of the current needs and the needs of the immediate future.

3. The conserving of veterinary manpower should be considered a function of Selective Service.

4. If considerable numbers of veterinarians are inducted as privates, the War Department will not be able to commission them immediately because of lack of position vacancies.

The directing board therefore recommended on October 12 that all state veterinary chairmen immediately prepare surveys of the veterinary manpower and its distribution for their respective states in order that the need for the occupational deferment of veterinarians might be factually substantiated in requests to the local Selective Service boards for the deferment of veterinarians. The data included in these surveys should be sufficient to enable these boards to judge the essential character of the work of any veterinarian for whom deferment is sought on the ground of occupational essentiality. It is further suggested that state chairmen immediately communicate with the state director of Selective Service for a discussion of the problem. It is apparent that deferment in the future will depend on the decision of the Selective Service boards.

ARMY

STATUS OF MEDICAL STUDENTS AND INTERNS WITH MEDICAL CORPS OF THE ARMY

THE JOURNAL on August 15 published an article by Major Gen. James C. Magee, the Surgeon General, U. S. Army, concerning medical education and the war. The last two paragraphs briefly detailed the provisions which were then in existence to permit medical students to continue their training by granting deferment from the draft. A modification of the announced policy necessitates a revision of that portion of General Magee's article.

The policy now in effect provides "that appointments in the Medical Corps of officers could be made only when an applicant is fully qualified in accordance with standards prescribed by the Surgeon General and approved by the War Department, and when their services are immediately available to the War Department in compliance with paragraph 7 i AR 605-10."

This change, in particular, alters the status of interns and the manner and time in which they may be commissioned in the Medical Corps of the Army of the United States. In brief it is now provided that instead of commissioning interns at the time of graduation as First Lieutenants, Medical Corps, Army of the United States, they will continue their R. O. T. C. line commissions (Infantry, Field Artillery, Cavalry and so on) throughout their four years of medical school and one year of essential rotating general internship. Then within sixty days of the time they are expected to complete the internship and go on active duty they may apply directly through the headquarters of the service commands, local medical officer recruiting boards or to the Surgeon General's Office for commissions in the Medical Corps, Army of the United States. This action was made necessary by the administrative difficulties of appointing such officers prior to their internships and not calling them to active duty until such internship was completed.

PROCUREMENT OF LOANS BY STUDENTS

A further matter of interest in this connection is that concerned with the procurement of loans by students. The following extract from Public Law 647, Seventy-Seventh Congress, Chapter 475, second session (H. R. 7181), is quoted.

"Loans to students in technical and professional fields (national defense): To assist students (in such numbers as the chairman of the War Manpower Commission shall determine) participating in accelerated programs in degree granting colleges and universities in engineering, physics, chemistry, medicine (including veterinary), dentistry and pharmacy, whose technical or professional education can be completed within two years, as follows:

"Loans: For loans to students whose technical or professional education can be completed within two years to enable them to pursue college courses, who attain and continue to maintain satisfactory standards of scholarship, who are in need of assistance and who agree in writing to participate, until otherwise directed by said chairman, in accelerated programs of study, in any of the fields authorized hereunder, and who agree in writing to engage, for the duration of the wars in which the United States is now engaged, in such employment of service as may be assigned by officers or agencies designated by said chairman, such loans to be made by such colleges or universities or public or college connected agencies from funds paid to them on estimates submitted by them as to the amounts necessary therefor, $5,000,000: provided that, in case it shall be found that any payment to any such college, university or public or college connected agency is in excess of the needs thereof for the purposes hereof, refund of such excess shall be made to the

Treasurer of the United States and the amount thereof credited to this appropriation. Loans hereunder shall be made in amounts not exceeding tuition and fees plus $25 per month and not exceeding a total of $500 to any one student during any twelve month period, said loans to be evidenced by notes executed by such students payable to the Treasurer of the United States at a rate of interest at 2.5 per cent per annum. Repayments of such loans shall be made through the colleges, universities or other agencies negotiating the loans and covered into the Treasury as miscellaneous receipts: provided that indebtedness of students who, before completing their courses, are ordered into military service during the present wars under the Selective Training and Service Act of 1940, as amended, or who suffer total and permanent disability or death, shall be canceled. The foregoing loan program shall be administered in accordance with regulations promulgated by the Commissioner of Education with the approval of the chairman of the War Manpower Commission."

ST. MARY'S HOSPITAL UNIT

The first U. S. Army Station Hospital to be organized in West Virginia began training at Fort McPherson, Atlanta, Ga., October 1. This unit, to be known as the St. Mary's Hospital Unit, was organized by Lieut. Col. Charles Frederick Fisher of Clarksburg, who will be in command of the unit, comprising eighteen doctors, forty-three nurses and about eighty-five hospital corps men, technicians and other members to be assigned by the Surgeon General's Office. Seven of the physicians in the unit were members of the staff of St. Mary's Hospital and ten of the nurses are graduates of the nursing school. The other members came from Wheeling, Fairmont, Lumberport, Parkersburg, Parsons and Weston. The unit was organized for service abroad. Wounded men in battle are evacuated to the station hospital in the field from the first aid dressing station, which is usually near the front lines. The station hospital may be set up at different points as the battle progresses. The St. Mary's Station Hospital Unit will have a capacity of 250 beds but will have equipment to care for temporarily as many as a thousand wounded soldiers before being taken farther back, the next hospital toward the rear being the evacuation hospital. The physicians on the staff of the St. Mary's Hospital, in addition to the officer in charge, will be Major Robert W. Lukens of Wheeling, chief of surgery; Major Robert H. Jones of Fairmont, chief of medicine; Capt. William H. Allman of Clarksburg, assistant surgeon; Capt. Edward Vacheresse Jr. of Fairmont, 1st Lieut. Joseph Gilman of Clarksburg and 1st Lieut. Wilson S. Phillips of Wheeling, ward surgeons; 1st Lieut. Paul McCuskey of Clarksburg and Raymond B. Nutter Jr. of Lumberport, assistant ward surgeons; Capt. Francis G. Genin of Clarksburg, psychiatrist; Capt. Karl L. van Horn of Fairmont, eye, ear, nose and throat; Capt. Samuel Weisman of Parsons, radiology; Capt. Robert T. Humphries of Clarksburg, orthopedic surgery, and Capt. John McCuskey of Clarksburg, genitourinary surgery.

In addition to the members of this hospital unit, various other members of the medical staff of St. Mary's Hospital and many graduates of its nursing school are already serving in the armed forces in various parts of the world.

WANT DOCTORS TRAINED IN SKIING AND MOUNTAIN CLIMBING

The Mountain Training Center, Camp Carson, Colo., reports that with the rapid expansion of the Mountain Troops the Army faces a shortage of medical officers with skiing or mountaineering experience. The War Department wants doctors and dentists who have a basic knowledge of skiing or mountain climbing. Mountain warfare is a specialized type of combat in which the treatment of injured men can best be handled by a medical unit skilled in the use of skis and climbing equipment. A wounded trooper's life may depend on the ability of his rescuers to ski to his aid.

Qualified doctors in or about to enter the military service are advised to make immediate application to the Adjutant General's Office, War Department, Washington, D. C., requesting assignment to the Mountain Troops.

MARRIED NURSES TO CONTINUE ON ACTIVE DUTY

The War Department announced that, effective October 1, members of the Army Nurse Corps who marry will, at the discretion of the Surgeon General, be continued in active service for the duration of the war and for six months thereafter. Heretofore nurses were discharged from the service on marriage. Nurses now on duty will not be permitted to resign unless replacements are available, and nurses appointed and ordered to active duty after Dec. 27, 1941 will not be permitted to resign during the present emergency. Those of the latter group will be released only for physical disability or incompetence.

ARMY ORDERS

Dr. Leo V. Schneider, Glenn Dale, Md., associate clinical professor of medicine at Georgetown University School of Medicine, Washington, D. C., has been ordered to active duty as a major and will be stationed at the Lawson General Hospital, Atlanta, Ga.——Lieut. Col. John P. Beeson, who has been in command of the station hospital at Fort Hancock, N. J., has been ordered to take command of the hospital at Salina, Kan. Colonel Beeson served in the last war in France as chief of the surgical staff of an evacuation hospital near Verdun. Major Nicholas R. Locascio, New York, formerly chief of the medical service at Fort Hancock, will succeed Colonel Beeson as commander of the station hospital there.

CIVILIAN DEFENSE

EMERGENCY BASE HOSPITALS

The Medical Division of the U. S. Office of Civilian Defense, through its regional medical officers and state chiefs of Emergency Medical Service, has now made emergency provision for the establishment of a chain of emergency base hospitals in the interior of all the coastal states. They will be activated only in the event of an enemy attack on our coast which necessitates the evacuation of coastal hospitals. Each base hospital will be related to the casualty receiving hospital which has been evacuated, and it is expected that the staff will be recruited largely from the parent institution.

In order to meet a sudden and unexpected crisis without delay, arrangements have been completed with state authorities for the prompt taking over of appropriate institutions in the interior of the state for this purpose and with local military establishments for the transportation of casualties and other hospitalized persons along appropriate lines of evacuation.

More than one hundred and fifty hospitals in the coastal cities are in the process of organizing small affiliated units of physicians and surgeons, which will be prepared to staff the Emergency Base Hospitals if they should be needed. These units are composed of the older members of the staff and those with physical disabilities which render them ineligible for military service, and of women physicians. In order that a balanced professional team may be immediately available the doctors comprising units are being commissioned in the inactive reserve of the U. S. Public Health Service so that, if called to duty, they may receive the rank, pay and allowances equivalent to those of an officer in the armed forces. Dr. George Baehr, chief medical officer of the U. S. Office of Civilian Defense, states that the members of these affiliated hospital units will continue to remain on an inactive status for the duration of the war unless a serious enemy attack occurs in their region which necessitates the transfer of casualties to protected sites in the interior. Their commissions may be terminated on their request six months after the end of the war, or sooner if approved by the Surgeon General. Such approval will be given in the event such officer desires active duty in the Army or Navy.

MISCELLANEOUS

GENERAL LIMITATION ORDER ON X-RAY EQUIPMENT

The manufacture and purchase of x-ray equipment will be circumscribed under General Limitation Order L-206, issued by the War Production Board under date of October 20.[1] Within the meaning of this order, x-ray equipment includes the following radiographic equipment, fluoroscopic equipment and therapy equipment: power units; radiographic, fluoroscopic and therapy tables; photofluorographic units; cassette changers; tube stands; stationary grids, and Bucky diaphragms. The order does not apply to use of rebuilt equipment or to any parts, accessories or appliances used in connection with radiography, fluoroscopy or therapy other than the items specifically named.

The order provides that no manufacturer shall manufacture or assemble any models or types of x-ray equipment other than the permitted number of models or the types set forth and described in a schedule published concurrently with the order. No person may sell, transfer or deliver any x-ray equipment except:

"(i) To the Army or Navy of the United States, the United States Maritime Commission and the War Shipping Administration, or

"(ii) To persons (such as hospitals, medical departments of industrial concerns, and other persons desiring to receive x-ray equipment) who have filed Form PD-556 . . . and have been specifically authorized on such form by the Director General for Operations to receive x-ray equipment."

Each person seeking authorization to receive x-ray equipment must prepare Form PD-556, copies of which may be obtained at the local offices of the War Production Board in the manner prescribed in the form. The form should be filed only by the person desiring to receive x-ray equipment and not by the person who makes delivery of such equipment. The application must state whether or not the applicant has in use any x-ray equipment as defined in the order and if so must give a description of it, must state the average number of patients per week on which such equipment is used and whether the equipment applied for would be used to replace existing equipment or is needed for expansion of existing facilities. The order form must show how the applicant accomplishes the work for which the equipment applied for would be used and must indicate what attempts have been made to obtain used or rebuilt equipment.

Any person affected by the order who considers that compliance therewith will work an exceptional and unreasonable hardship on him may apply to the War Production Board setting forth the pertinent facts and the reasons such person considers that he is entitled to relief. The Director General for Operations may thereupon take such action as he deems appropriate. The order and all transactions affected thereby are subject to all applicable provisions of the Priorities Regulations of the War Production Board.

1. Federal Register, Oct. 21, 1942, p. 8475.

WAR RECREATION CONGRESS

More than nine hundred delegates from the United States, Canada and England attended the War Recreation Congress in Cincinnati, September 28-October 2 (THE JOURNAL, August 8, p. 1207). All branches of the armed forces, many other agencies of the government, representatives of industry and organized labor and delegates from both public and private agencies participated in the eight general sessions, thirty-six discussion meetings and many special meetings and luncheons. The full proceedings of the conference are being printed and will be available soon.

The director of the Division of Recreation of the Federal Security Agency, Mr. Mark McCloskey, discussed the recreation services for men in uniform and workers in industry in communities throughout the country and in certain overseas bases. Lieut. Comdr. Arthur T. Noren of the U. S. Navy and Colonel Dumont of the Special Service Division of the Army told of the recreational programs being carried on directly in the camps by the Army and Navy. Mr. Harry Wann outlined the recreation services being performed by the American Red Cross within base hospitals and in clubs overseas. Mr. Ray Johns of the United Services Organization told of the special services performed by this organization in providing clubs and other recreational services in various communities. One general session was devoted to recreational services for industrial workers. Special attention was given to wartime problems of girls and women. It was said that one of every five boys has an opportunity for favorable recreational activities, while only one of ten girls has this opportunity. The release from the National Recreation Association states that a spectacular increase in juvenile delinquency, especially among girls from 12 to 15 years of age, has occurred since the United States entered the war. It was announced that thirteen million women are now engaged in war industry with five million more expected by the end of the year. Communities were urged to see that recreation agencies were cooperating in providing recreation facilities and leadership to serve these women. Among other problems before the War Recreation Congress were home and family recreation, recreation provided by churches, boys' and girls' clubs, organized camping and the use of music and drama in recreation programs.

Concern was expressed by the leaders of the recreation movement over the question of personnel. They are faced with demands for greatly increased service and at the same time with the loss of trained personnel. Many cities already have lost their chief executives in the field of recreation.

MENTAL HYGIENE OF WAR SERVICE FOR EIGHTEEN AND NINETEEN YEAR OLD MEN

AN OPEN LETTER

So much has been said and so much implied about the desirability of drafting 18 and 19 year old men for military service from the point of view of emotional stability that it seems that, in the public interests a simple, direct statement should be made on this question.

Speaking as individuals, we wish to assure the public and parents of this age group that there are no grounds for apprehension as to the effect of military service on these younger men as distinguished from the older men. Such statistics as are available indicate that the incidence of mental breakdowns is no greater in the 18 and 19 year age group than in the older group. If anything it is somewhat less. It would seem to us that the proposal now before the American Congress does not unduly compromise the future mental integrity of this particular age group or of the nation. With the government realizing and properly assuming this increased responsibility, we endorse favorable action on the proposal to include men of 18 and 19 years under the Selective Service Act.

ADOLF MEYER, M.D., Baltimore.
Professor emeritus of psychiatry, Johns Hopkins University School of Medicine.

C. MACFIE CAMPBELL, M.D., Cambridge, Mass.
Professor of psychiatry, Harvard Medical School.

FOSTER KENNEDY, M.D., Utica, N. Y.
Professor of neurology, Cornell University Medical College.

C. CHARLES BURLINGAME, M.D., Hartford, Conn.
Psychiatrist-in-chief, Neuro-Psychiatric Institute.

EDWIN G. ZABRISKIE, M.D., New York.
Professor of clinical neurology, Columbia University College of Physicians and Surgeons.

WINFRED OVERHOLSER, M.D., Washington, D. C.
Superintendent, St. Elizabeth's Hospital.

S. BERNARD WORTIS, M.D., New York.
Professor of psychiatry, New York University College of Medicine.

TRACY PUTNAM, M.D., New York.
Professor of neurology, Columbia University College of Physicians and Surgeons.

OSCAR DIETHELM, M.D., Utica, N. Y.
Professor of psychiatry, Cornell University Medical College.

ORGANIZATION SECTION

OFFICIAL NOTES

ANNUAL CONFERENCE OF SECRETARIES AND EDITORS

The Annual Conference of Secretaries and Editors of Constituent State Medical Associations will be held at the offices of the Association in Chicago on Friday and Saturday, November 20 and 21.

The first meeting will begin at 10 a. m., Friday, November 20. An afternoon meeting and an evening meeting will be held on November 20 and the conference will adjourn at the end of a morning meeting on Saturday, November 21.

The program has been arranged in accord with the expressed wishes of state secretaries and editors who have indicated the nature of subjects which they wish to have discussed. The Surgeon General of the United States Navy and the Surgeon General of the United States Public Health Service will address the conference at the first meeting on Friday morning, November 20. The Surgeon General of the Army has expressed regret that it will not be possible for him to be present, but he will be represented by Brig. Gen. L. B. McAfee, who is well known to many of the members of the conference. The chairman of the directing board of the Procurement and Assignment Service, Dr. Frank H. Lahey, Past President of the American Medical Association, and Dr. L. G. Rowntree, representing the Selective Service System, will also address the conference during its first day, as will Dr. Creighton Barker of Connecticut, who has made some intensive studies pertaining to the provision of medical care of the civilian population in crowded areas. Dr. Walter F. Donaldson, chairman of the War Participation Committee of the American Medical Association, will present a paper.

The first meeting of the conference will be called to order by Dr. Roger I. Lee, Chairman of the Board of Trustees of the American Medical Association, at 10 a. m., Friday, November 20. After the selection of a chairman, Col. Fred W. Rankin, President of the American Medical Association, will address the conference and at the opening of the afternoon meeting on Friday, November 20, Dr. James E. Paullin, President-Elect of the American Medical Association, will present an address. A dinner meeting will be held on Friday evening, November 20, at which Dr. Stanley B. Weld, editor of the *Connecticut State Medical Journal*, will preside and will deliver an address. Dr. Julian P. Price of South Carolina will present a paper which will deal with the best methods of disseminating information among the members of county and state medical societies.

At the meeting of the conference Saturday morning, November 21, Dr. James C. McCann of Massachusetts will discuss the general subject of medical service plans and Mr. A. M. Simons of the Bureau of Medical Economics of the American Medical Association will present a paper dealing with service plans sponsored by the Farm Security Administration.

In addition to the secretaries and editors of state medical associations, it is expected that a number of presidents and other officers of state associations and county medical societies will be present on that occasion. Other physicians who may wish to attend will be heartily welcome.

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Changes in Status.—S. 2412 has been reported to the House, a bill to provide benefits for the injury, disability, death or enemy detention of employees of contractors with the United States. H. R. 7568 has passed the House, a bill proposing to discharge more effectively the obligations of the United States under certain treaties relating to the manufacture and distribution of narcotic drugs, by providing for the domestic control of the production and distribution of the opium poppy and its products.

Bill Introduced.—H. R. 7742, introduced by Representative Tolan, California, a bill (1) to inventory and mobilize all the economic resources of the United States including manpower, facilities, materials, technical and scientific knowledge, and natural resources for maximum use in the provision of military and essential civilian needs and (2) to adjust and stabilize the economy in accordance with the needs of full mobilization and other conditions created by war.

DISTRICT OF COLUMBIA

Change in Status.—S. Res. 302 has been agreed to by the Senate, requiring the Federal Works Agency, the Public Health Service, the District commissioners and other government agencies and officials charged with the responsibility of providing the people of Washington and its environs with adequate hospital facilities to prepare and submit to the Senate a report. This report, which is to be made within fifteen days, is to set forth plans and specifications which have been adopted, and those which are under study and consideration as to their feasibility, possibility and availability, together with the present status of each project, actual or contemplated, and to give in detail the type of accommodations and facilities which are considered necessary to meet the situation existing and to rectify the conditions prevailing, including supplies and equipment of all kinds necessary to an immediate carrying out of the program in full.

MEDICAL ECONOMIC ABSTRACTS

MEDICAL CARE FOR RECIPIENTS OF PUBLIC ASSISTANCE UNDER THE SOCIAL SECURITY ACT

Federal grants to assist states in providing medical care for the aged, the blind and dependent children who are recipients of assistance under the Social Security Act are proposed by H. R. 7411, a bill introduced by Representative Coffee of Washington, July 20. At the option of the state, needy members of the household of such recipients may also be furnished medical care. An appropriation of $18,000,000, it is proposed, will be authorized for the fiscal year to carry out this program, and thereafter each year a sum sufficient to carry out the purposes of the program will be made available. This federal money will be used in making allotments to the several states which have developed plans that have been approved by the Social Security Board. As defined by the bill the term "medical care" includes only such physicians' and nurses' services, drugs and other medicines, prosthetic and other appliances, hospitalization and other services and supplies for treatment and care of the recipients of public assistance and needy members of their household as may be approved in regulations to be promulgated by the Social Security Board. Medical care may be provided directly either by the state or by other agency administering or supervising the administration of the plan, or indirectly through payments by the state or other agency to the person or persons furnishing such care. The bill is pending in the House Committee on Ways and Means.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Changes in Health Personnel.—Dr. Frederick G. Hall, formerly of Galesburg, Ill., has been named assistant city health officer of Long Beach.——Dr. Paul G. Buss, Los Angeles, has been appointed assistant county health officer of Orange County, Anaheim.——Dr. Lester S. McLean, San Francisco, was named health officer of Solano County, August 3, succeeding Dr. George O'Brien, Fairfield, resigned.——Dr. Roscoe C. Main, Los Angeles, at one time health officer of Santa Barbara County, has been appointed in charge of the Glendale district health unit, succeeding Dr. John M. Buchanan, Glendale, who has entered army service.

School of Public Health Proposed.—The Northern California Public Health Association recently appointed a committee —Drs. William P. Shepard, chairman, Fred T. Foard, Bertram P. Brown, Charles Edward Smith, Karl F. Meyer, and Mr. W. Ford Higby and Mr. Lawrence Arnstein—on the establishment of a Western school of public health. According to *Western Public Health* the committee has made definite proposals to the University of California at Berkeley, including preparation of a tentative budget, and plans to prepare and sponsor a bill in the 1943 state legislature which would ask for a special appropriation for the purpose.

Tuberculosis Association Creates Heart Division.—The Los Angeles Tuberculosis and Health Association has created a heart division to carry on a program of education and study so that adequate community facilities may be provided for the prevention of heart disease in Los Angeles. The new service will be under the direction of Mr. James G. Stone, Los Angeles, executive secretary of the Los Angeles Tuberculosis and Health Association. Members of the Los Angeles Heart Association will act as the advisory committee and Majorie Edwards, San Francisco, executive secretary of the California Heart Association, will direct the new program for the coming year. Emphasis will be placed on establishing effective health educational programs on heart disease prevention in cooperation with the Tenth District of the California Congress of Parents and Teachers, on providing health education aids in cooperation with the city schools, on standardizing heart clinics and on promoting convalescent care for heart patients.

DISTRICT OF COLUMBIA

Council to Oversee Students' Health.—Wilson Teachers' College, Washington, has formed a Health Council to check the health and physical condition of students and faculty, newspapers reported on September 27. The council includes two students, faculty members from different academic departments and from the physical education department, the college nurse, the manager of the cafeteria and the chief custodian. Henry W. Olson, Ph.D., professor of biology, is chairman of the council.

Annual Registration of Physicians Required. — Every person holding a license to practice the healing art in the District of Columbia must register with the secretary-treasurer of the Commission on Licensure during the month of December of each year and pay a fee of $2. Holders of more than one type of license must register each license separately. A licentiate who does not register and pay the fee will be subject to a penalty of $5; if he fails to register and pay the penalty, and continues to practice, he will, at the end of ten days after December 31, be considered as practicing medicine without a license and penalized as otherwise provided in the healing arts practice act. The secretary-treasurer of the Commission on Licensure must, on or before December 1, mail to each licentiate, at his last known address, a blank form for registration.

IDAHO

State Medical Election. — Dr. Parley Nelson, Rexburg, was chosen president-elect of the Idaho State Medical Association at its annual meeting in September and Dr. George O. A. Kellogg, Nampa, was inducted into the presidency. Dr. Franklin B. Jeppesen, Boise, is the secretary.

ILLINOIS

Postgraduate Conference. — The Illinois State Medical Society sponsored a postgraduate conference at the Jefferson Hotel, Peoria, October 22, in cooperation with the Peoria County Medical Society. The following program was presented:

Dr. Chester R. Zeiss, Chicago, The Paraffin Wax Treatment of Burns.
Dr. James J. Callahan, Chicago, The Minimum Requirement in Treatment of Fractures.
Dr. Arrie Bamberger, Chicago, Treatment of Soft Tissue Injuries.
Dr. Italo F. Volini, Chicago, The Oral, Intravenous and Intra-Abdominal Uses of Sulfonamides.
Dr. Warren H. Cole, Chicago, Recognition and Treatment of Shock.
Lieut. Col. Joel L. Deuterman, M. C., U. S. Army, Camp Grant, Treatment of War Gases.
Dr. Harold M. Camp, Monmouth, and Lieut. Col. Randolph F. Olmsted, M. C., U. S. Army, Chicago, The Doctor Goes to War.

Chicago

Postpone Construction of University Hospital.—Construction of a million dollar hospital on the campus of the University of Chicago has been postponed until after the war, newspapers reported on October 2. Part of the funds available for the new hospital will be released to care for charity patients at Albert Merritt Billings Hospital. The proposed hospital for the study and treatment of contagious diseases will be located on a site donated by the University of Chicago on the east side of Drexel Boulevard, between Fifty-Eighth and Fifty-Ninth streets. Three trust funds have been merged to build the hospital, which will be known as the Charles Gilman Smith Hospital under the terms of a trust fund established by Mrs. Harriet G. Smith, who died in 1896. The Smith trust fund has reached more than $500,000, it was stated. Trustees for the estate of the late Mrs. Annie W. Durand have pledged $160,000, and the John R. McCormick Memorial Institute for Infectious Diseases $300,000. An order signed by Judge Cornelius Harrington, June 28, 1940, called for construction of the hospital within five years. The proposal to use the current net income from Mrs. Durand's estate for charity patients at the Billings Hospital was made by the Northern Trust Company, trustee for the estate. Mrs. Durand's will stipulated that funds were to be used for the construction of hospitals "in the poorest and most thickly settled parts" of Chicago. Durand Hospital, on Wood Street, was built in 1913 and operated by the McCormick Institute but was discontinued in 1933. On October 1 Judge Harrington approved an order directing the trustee for the $300,000 estate of Mrs. Durand to donate part of the $12,000 yearly net income for the treatment of poor patients suffering from communicable or contagious diseases.

INDIANA

Dr. Lawson Observes Ninety-Third Birthday. — Dr. Wilson T. Lawson, Danville, county health officer and secretary of the Hendricks County Medical Society, observed his ninety-third birthday September 3. Dr. Lawson, who is still practicing, graduated at Miami Medical College, Cincinnati, in 1878.

Dr. Tucker Wins Scholarship.—The 1942 scholarship of the Indiana Tuberculosis Association has been awarded to Dr. Warren S. Tucker, Indianapolis, entitling him to attend a six week course at the Trudeau School for Physicians at Saranac Lake, N. Y. Dr. Tucker is in charge of tuberculin testing and case finding in schools and colleges for the Marion County Tuberculosis Association.

State Medical Election.—Dr. Jacob T. Oliphant, Farmersburg, was chosen president-elect of the Indiana State Medical Association at its meeting, October 1, and Dr. Carl H. McCaskey, Indianapolis, was installed as president. Other officers are Dr. Arthur W. Weyerbacher, Indianapolis, treasurer and Mr. Thomas A. Hendricks, Indianapolis, secretary. The next annual session is planned for Indianapolis.

MASSACHUSETTS

Psychiatry Clinic Opened. — The Boston Psychoanalytic Institute officially opened the Psychiatry Clinic at 82 Marlborough Street, Boston, October 5. The clinic is to be conducted on a nonprofit basis, and patients will be treated without charge or for a nominal fee. It will accept and treat as patients those persons who can be psychiatrically considered as having "civilian war neurosis." The purpose of psychotherapy will be chiefly to remove the traumatic symptoms in order to restore the patient as quickly as possible to his former occupation. For this reason, states an announcement, the treatment will consist of a short period of psychotherapy evolved for this purpose. Psychoanalysis can and will be given only in rare cases. A report of the clinic work and its results is to be published yearly and of research work in special articles periodically. The clinic is planning to arrange courses and semi-

nars for the training of psychiatrists in the approach to these war neuroses and in the technic of this kind of psychotherapy. Drs. M. Ralph Kaufman and Felix Deutsch, Boston, are directors of the clinic, which is staffed by eighteen psychiatrists, five assistant psychiatrists and two psychologists, all of whom will devote part time without charge. A group of consulting physicians represents the specialties of endocrinology, medicine, surgery, dermatology, gynecology, otolaryngology, allergy, neurology and pediatrics. The Boston Psychoanalytic Institute was incorporated in 1936 under the laws of Massachusetts to establish and maintain an institution of learning in the field of psychoanalysis and related subjects, to teach and promote the study and practice of and cultivate knowledge in psychoanalysis, to establish and maintain a clinic for the practice and application of psychoanalysis and related subjects and to provide the names and facilities to accomplish any or all of these objectives. Until the present, its principal work has consisted of providing lectures, courses and seminars on psychoanalysis and related subjects, with particular emphasis on the training of psychiatrists in the special technic and knowledge of psychoanalysis. The trustees of the institute unanimously voted on February 26 to operate a psychotherapeutic clinic for ambulatory patients whose problems are related to the present war situation.

MICHIGAN

Dr. James Bruce Now Vice President Emeritus.—Dr. James D. Bruce, director of postgraduate medicine at the University of Michigan Medical School, Ann Arbor, since 1928 and vice president in charge of university relations since 1931, retired October 17 with the title "vice president emeritus." Dr. Bruce reached the retirement age of 70. Dr. Bruce graduated at the Detroit College of Medicine in 1896 and joined the faculty of the University of Michigan as assistant in internal medicine in 1904. He has served as director of internal medicine at the medical school, chief of the medical service at the university hospital, chairman of the division of health sciences since 1935 and chairman of the division of extramural services. Dr. Bruce is a member of the medical advisory committee, division of medical sciences, of the National Research Council. He was a major in the U. S. Army during World War I.

NEW YORK

Lecture on Rheumatic Fever.—Dr. John G. Fred Hiss, Syracuse, will deliver a lecture on rheumatic fever before the Cortland County Medical Society, November 20. The lecture is sponsored by the state department of health and the state medical society.

Annual Cancer Meeting.—At the eighteenth annual meeting of the New York State Committee of the American Society for the Control of Cancer, Inc., in Rochester on October 6 the speakers were Dr. Arthur H. Paine on "Malignancy of the Genitourinary System" and Dr. Andrew H. Dowdy, "Role of Radiation Therapy in the Control of Malignant Disease." Dr. John M. Swan spoke on "The Five and Ten Year Survivals of Patients Treated in the Rochester Hospitals." Mrs. Louis H. Jacobs was elected secretary, Mr. Stephen E. Godden treasurer and Dr. Swan executive secretary, all of Rochester.

Personal.—Paul O. Komora, since 1932 associate secretary of the National Committee for Mental Hygiene, has been appointed assistant secretary of the New York State Department of Mental Hygiene. Mr. Komora has been with the National Committee for Mental Hygiene since 1917.—Dr. Raymond F. C. Kieb, former commissioner of correction, retired on September 15 as medical superintendent of the Institution for Male Defective Delinquents at Napanoch. Dr. Kieb served as superintendent of Matteawan State Hospital, Beacon, from 1913 to 1927, when he took a leave of absence for three and one-half years' service as commissioner of correction. He returned to Matteawan in 1930 and was transferred to Napanoch in 1940. Dr. Kieb will maintain an office in New York.

New York City

Bequest Provides for Free Blood Transfusions.—Under the will of Mrs. Virginie Migeon Swift, widow of Dr. Edwin Elisha Swift, $50,000 of a bequest to St. Luke's Hospital is to be used for free blood transfusions for patients unable to pay for them. The hospital will share with three other institutions the residuary estate of Mrs. Swift.

Minimum Heat for Buildings That Use Oil.—The city department of health has fixed a minimum legal temperature of buildings heated by oil in the city at 65 F. Places heated by coal, gas or other means will still maintain the 68 degree minimum, according to the New York *Times*. The change was made because of the reduction in the available supply of fuel oil.

Lectures for the Public.—The New York Academy of Medicine will open its annual series of lectures for the public November 12, with a talk by Robert R. Williams, D.Sc., on "Food and Civilization." The speaker for January 28 has not yet been decided, but other lecturers will be:

Col. Edgar Erskine Hume, M. C., U. S. Army, Washington, D. C., December 10, War and Medicine.
Dr. Franz Alexander, Chicago, February 25, Aggressiveness—Individual and Collective.
Myrtle B. McGraw, Ph.D., New York, March 25, Growing Up Normally.
Dr. Bernard Glueck, Ossining, N. Y., April 22, Crime and Punishment.

City Cancer Clinic Closed.—The New York City Cancer Clinic at 124 East Fifty-Ninth Street has been closed because it has "outlived its usefulness." Patients at the clinic will be treated at clinics in other hospitals with modern facilities. With its present case load, the clinic was operating at an excessive cost to the city, $5.36 a visit, whereas under the new arrangement the cost will be less than $2 a visit. The staff of the clinic will be distributed among other hospitals. Under the new arrangement, depending on the patient's residence, treatment will be given at Queens General Hospital, Morrisania City Hospital or Memorial Hospital or the Brooklyn Cancer Institute. The city cancer clinic is 19 years old.

Annual Campaign for Hospital Funds.—The sixty-fourth annual campaign of the United Hospital Fund opened at the Hotel Waldorf-Astoria October 13. The speakers included James M. Landis, director of the Office of Civilian Defense; Dr. Philip D. Wilson, medical director of the Hospital for the Ruptured and Crippled, and Roy E. Larsen, president of the fund. Seventy-six voluntary nonprofit hospitals in the five boroughs of New York will be the beneficiaries of the campaign. More than 6,000,000 patient-days in the hospitals, including 2,000,000 days of free ward service, and 5,000,000 outpatient visits, including 2,000,000 representing free service with medicine included, are the 1941 service figures for this hospital group.

NORTH CAROLINA

Report of Committee on Mental Hospitals.—The creation of a central board to coordinate the control of state mental hospitals was one of the recommendations of a committee appointed in February to make an investigation of the State Hospital at Morganton. The committee submitted a report in August. The report also recommended the employment of a general superintendent of mental hygiene to be responsible for the direction of the state institutions and to establish and superintend a system of outpatient mental hygiene clinics at the various hospitals, at the medical colleges within the state and at such community and public hospitals as may volunteer to cooperate. It was stipulated that the general superintendent of mental hygiene should be a doctor of medicine.

OKLAHOMA

Dr. Lowry Made Dean at Oklahoma.—Dr. Tom Lowry, professor of clinical medicine, has been appointed dean of the University of Oklahoma School of Medicine, Oklahoma City, on a part time basis. He will serve from November 15 to July 1, 1943. Dr. Robert U. Patterson, who has been dean since 1935, is retiring on account of age.

Postgraduate Instruction.—On October 16 the Oklahoma State Medical Association began a ten week program of postgraduate medical instruction in internal medicine. The program has been made possible through the financial cooperation of the Commonwealth Fund of New York and the Oklahoma State Department of Public Health. Dr. Luke W. Hunt, Chicago, is conducting the course. Meetings will be held in Tulsa each Friday night alternately at Hillcrest Memorial and St. John's hospitals. Similar meetings will be held in Pawhuska, Ponca City, Sapulpa and Stillwater. The course will include a discussion of chronic arthritis and allied conditions, gastrointestinal diseases, disorders of the heart, cardiovascular renal disease, the anemias and blood dyscrasias, chronic nontuberculosis pulmonary disease, diabetes mellitus, sulfonamide drugs, nutritional disease and deficiency states, and endocrine disorders.

WEST VIRGINIA

Industrial Health Institutes.—The committee on industrial health of the state medical association and the bureau of industrial medicine of the state department of health cooperated in a series of industrial health institutes in Bluefield, Charleston, Fairmont and Wheeling, October 20-23. Speakers included:

Dr. John W. Crosson, Charleston, Industrial Hygiene in West Virginia.
Dr. Emery R. Hayhurst, Columbus, Ohio, Control of Health in Industry.
Charles L. Heaberlin, Charleston, Cost of Industrial Injuries.
Dr. Orlen J. Johnson, Chicago, The Responsibilities of American Medicine to War Production.
J. J. Bloomfield, Bethesda, Md., Industrial Hygiene and War Production.
Van A. Bittner, Washington, D. C., Labor's Evaluation of Public Health Service and Industrial Hygiene Among Workers in Industry.

WISCONSIN

State Medical Election.—Dr. Russell M. Kurten, Racine, was chosen president-elect of the State Medical Society of Wisconsin at its annual meeting in September and Dr. Francis E. Butler, Menomonie, was installed as president. Mr. Charles H. Crownhart, Madison, is the secretary. The 1943 session will be held in Milwaukee in September, the dates to be decided later.

Industrial, Medical and Surgical Clinic.—"Keep 'Em Working" will be the theme of the postgraduate industrial, medical and surgical clinic in Milwaukee, November 17, given under the auspices of the committee on industrial health and the council on scientific work of the state medical society in cooperation with the industrial hygiene unit of the state board of health. Among the speakers will be:

Mr. Harry A. Nelson, Milwaukee, The Physician's Responsibility Under the Workmen's Compensation Act.
Dr. Merritt L. Jones, Wausau, The Evaluation of Disability in Industrial Injuries.
Dr. James R. Regan, Milwaukee, Knee Joint Injuries and Their Treatment.
Dr. Elston L. Belknap, Milwaukee, Poisons in Industry.
Dr. Raymond W. McNealy, Chicago, The Handicap of Hernia in Industry.
Dr. Chester C. Schneider, Milwaukee, Reduction of Disabilities in Fracture Management.
Dr. Carl W. Eberbach, Milwaukee, Traumatic Shock.
Dr. Harry W. Sargeant, Wauwatosa, Hospital Facilities and Inadequacies During the Accelerated Program.

Round table discussions will be held by:

Dr. Harry E. Mock, Chicago, Skull Fractures.
Dr. Newell C. Gilbert, Chicago, The Coronary Artery in Industry.
Dr. Herman C. Schumm, Milwaukee, Rehabilitation Following Fractures.
Dr. Russell M. Kurten, Racine, The Physical Examination in Industry.
Dr. Erwin R. Schmidt, Madison, Injuries to the Scalp, Skull and Brain.
Dr. Eben J. Carey, Milwaukee, Anatomical Considerations in Back Injuries.
Dr. John O. Dieterle, Milwaukee, Intervertebral Disk Diseases.
Dr. Stephen E. Gavin, Fond du Lac, Therapy of Burns.
Dr. John L. Garvey, Milwaukee, Neuritis Following the Use of Serum.
Dr. William E. Grove, Milwaukee, Ear and Eye Complications of Craniocerebral Injuries.
Mr. William D. James, president, James Manufacturing Company, Fort Atkinson, Health in Industry.
Mr. Andrew T. Court, General Motors Corporation, Detroit, Sickness Absenteeism in Industry.

GENERAL

Western Surgical Cancels Meeting.—The Western Surgical Association has canceled its meeting which was to be held in Memphis, Tenn., December 4-5.

Annals of Medical History to Be Suspended.—Paul B. Hoeber, Inc., announces that with the issue of November publication of the *Annals of Medical History* will be suspended.

Committee to Study Effect of Radio on Public Morale.—A committee has been appointed to study radio broadcasting from the standard of morale and public health and to act as permanent consultant to the National Broadcasting Company. The committee will also make recommendations on how the network may better its efforts to promote national welfare and aid the war. Members of the committee, whose work will be supervised by James Rowland Angell, LL.D., educational counselor, are Dr. Morris Fishbein, Editor of THE JOURNAL, chairman; Dr. Henry R. Viets, lecturer on neurology, Harvard Medical School, Boston, and Dr. Winfred Overholser, professor of psychiatry, George Washington University School of Medicine, Washington, D. C.

Chemical Exposition.—The National Chemical Exposition will be held at the Hotel Sherman, Chicago, November 24-29. One feature of the exposition will be a symposium on electron microscopists with George L. Clark, Ph.D., professor of chemistry, University of Illinois, Urbana, Ill., presiding. Vladimir K. Zworykin, Ph.D., director of the electronic research laboratories of the Radio Corporation of America Manufacturing Company, Camden, N. J., will speak on "The Electron Microscope in Relation to Chemical Research." Other speakers will include Charles G. King, Ph.D., New York, on "Food and the Relation of Food to the Chemistry of Plants and the Soils"; Leonard A. Maynard, Ph.D., Ithaca, N. Y., "The Soil and Crop Basis of Better Nutrition"; William A. Albrecht, Ph.D., Columbia, Mo., "Soil Fertility and the Human Species," and P. Gerald Kruger, Ph.D., Urbana, "The Cyclotron and Its Uses in Research."

Food and Drug Officials Organize for Emergencies.—Food and drug officials of the New England states, New York and New Jersey organized at a meeting in Albany, October 9, to provide protection for food and drugs in the event of enemy attack. Hermann C. Lythgoe, B.S., director of the division of food and drugs of the Massachusetts Department of Public Health, Boston, was selected as chairman and Herbert Plank of the Dairy and Food Commission of Connecticut as secretary. The purpose of the organization is to give mutual assistance in the case of bombing or other catastrophes. Any single state might find itself lacking sufficient personnel to enforce laws for the prevention of the sale of unwholesome food and to make laboratory tests, according to the New York *Times*. It was proposed to have a central office where the officials of other states might ask assistance and where statistics might be kept. An executive committee composed of representatives of all states concerned will be in charge of the work.

Prize for Window Display on Psychiatry.—A prize of $100 is offered by the Menninger Foundation for Psychiatric Education and Research for the best suggestion for a window display in a New York bank presenting the uses and purposes of psychiatry. The window is 13 feet long and 6 feet high, and its deepest point about 8 feet; it curves so that it is narrower at the ends. It will be seen chiefly by laymen, and hence the display should be in the nature of an educational theme, convincingly and graphically presented. It should dramatize the way in which psychiatry can be or is being useful either in the present war emergency or in peacetime. The judges will be Dr. George S. Stevenson, New York, director of the National Committee for Mental Hygiene, Mr. Albert D. Lasker, New York, of Lord and Thomas, and Dr. Lawrence S. Kubie, New York. Ideas should be submitted in detail, preferably with drawings or diagrams, directly to Dr. William C. Menninger, director of the Menninger Clinic, Topeka, Kan., on or before Jan. 31, 1943.

Central Society for Clinical Research.—The annual meeting of the Central Society for Clinical Research will be held at the Drake Hotel, Chicago, November 6-7. Among the speakers will be:

Drs. James Dewey Bisgard, and Howard B. Hunt, Omaha, Mechanism for the Action of X-Ray Therapy on Infection.
Dr. John M. Adams, Minneapolis, Comparative Study of the Pathogenesis and Pathology of Pneumonitis In Infancy.
Dr. Louis R. Limarzi, Chicago, Effect of Arsenic (Fowler's Solution) on Erythropoiesis.
Dr. Raphael Isaacs, Chicago, Effect of Pectin on the Coagulation of Blood in Thrombocytopenic Conditions.
Drs. Edgar A. Hines Jr. and Lealdes M. Eaton, Rochester, Minn., Experiences with Treatment of Migraine with Potassium Thiocyanate.
Drs. Eliot E. Foltz, Clifford J. Barborka, and Andrew C. Ivy, Chicago, Influence of a Diet Deficient in the Vitamin B Complex on the Work Output of Trained Subjects: Experimental Procedure.
Drs. Hans L. Popper and Frederick Steigmann, Chicago, Causes of the Drop of the Plasma Vitamin: A Level in Liver Diseases.
Drs. William C. Olson and Heinrich Necheles, Chicago, Experimental Studies on Burns.

A joint meeting of the Central Inter-Urban Clinical Club and the Central Clinical Research Club will be held on November 5.

New Journal on Gastroenterology.—The American Gastroenterological Association on January 1 will publish the first issue of a new journal to be called *Gastroenterology*. It will be owned by the association but published by Williams and Wilkins Company; the subscription will be $6 a year. Dr. Walter C. Alvarez, Rochester, Minn., will be the editor after June 1943, and Dr. Andrew C. Ivy, Chicago, will be the assistant editor. The editorial board will consist of Drs. Abraham H. Aaron, Buffalo, N. Y.; Jacob A. Bargen, Rochester, Minn.; Henry L. Bockus, Philadelphia; William C. Boeck, Los Angeles; Burrill B. Crohn, New York; Robert Elman, St. Louis; Edward Hollander, New York; Sara M. Jordan, Boston; John L. Kantor, New York; Byrl R. Kirklin, Rochester, Minn.; Paul Klemperer, New York; Frank H. Lahey, Boston; Frank C. Mann, Rochester, Minn.; Herman J. Moersch, Rochester, Minn.; Walter L. Palmer, Chicago; Julian M. Ruffin, Durham, N. C.; Rudolf Schindler, Chicago; Dwight L. Wilbur, San Francisco, and Victor C. Myers, Ph.D., Cleveland. *Gastroenterology* invites for publication clinical and investigative contributions which are of interest to the general practitioner as well as the specialist and which deal with the diseases of digestion and nutrition. Manuscripts should be sent to Dr. Andrew C. Ivy, Gastroenterology, 303 East Chicago Avenue, Chicago. Letters regarding subscriptions and business matters should be addressed to Mr. R. S. Gill, Williams and Wilkins Company, Baltimore.

CORRECTION—THE NEW DIRECTORY

St. Elizabeth Hospital, La Fayette, Ind.—The new Seventeenth Edition of the American Medical Directory shows correctly that St. Elizabeth Hospital, La Fayette, Ind., is approved for intern training by the Council on Medical Education and Hospitals and approved for nurse training by the Indiana State Board of Nurse Examiners. It should also have indicated that the hospital is approved by the American College of Surgeons.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 26, 1942.

The Call-Up of Doctors for the War

On the outbreak of war a committee of leading members of the medical profession was set up by the minister of health to advise on measures to secure economy in medical manpower and on the allocation of doctors between the fighting forces and the civilian population. The committee recommended the setting up of a committee in each of the civil defense regions into which the country has been divided charged to secure the maximum cooperation to meet civilian and service needs in the area and to eliminate underemployment and overlapping of doctors. This was done. Other recommendations adopted included the raising of the military age limit for doctors from 41 to 46 years and compulsory powers to transfer the staff from one hospital to another. The transference of general practitioners from one area to another where they are more urgently required was considered. But the difficulties were found to be insuperable because of the personal nature of the services rendered and the financial problems involved. In a later report further measures were recommended to meet the irreducible needs of the fighting forces. The following were adopted: a percentage reduction of hospital staffs; greater mobility in the use of the remaining staffs between one hospital and another; recruitment of one hundred physicians serving in mental institutions; restriction to six months of the period for which newly qualified doctors hold hospital appointments before entering the fighting services; review of public health staffs so as to release more doctors for the services; compulsory recruitment of women doctors. More than eight hundred alien doctors—Poles, Czechs, Germans and Austrians—have been employed. Medical schools have been asked to reduce their clinical course by six months and to discontinue postgraduate courses which involve the whole time attendance of medical men and women for a considerable period.

THE EFFECT ON CIVILIAN PRACTICE

Discussing these reports at a press conference, the minister of health, Mr. Ernest Brown, said that in view of the increasing demands of the fighting forces, the women's auxiliary services, the civil defense services and war factories the civil population must in the coming winter manage with considerably fewer doctors. Before the war we had one doctor to 2,200 of the population; now the number was one to 2,700. Moreover, the doctors who remained were mainly the older men. Nor could the present proportion be maintained as the call-up continued. But we were much better off than the Germans, who had only one doctor to well over 12,000 of population. He asked patriotic citizens to lighten as much as possible the burden on overworked doctors. Dr. G. C. Anderson, secretary of the Central Medical War Committee, asked them to help by observing the following rules: 1. Call the doctor early in the illness and early in the day—if possible not later than 10 a. m. 2. Send an accurate message, including exact address and concise information about the illness. 3. If you can travel, visit the doctor rather than ask him to come.

A Chair of Child Health

The last of the many munificent gifts to medicine of the automobile magnate Lord Nuffield is an offer from his Provincial Hospital Trust of $75,000 toward the cost of establishing a chair of child health at King's College, Newcastle-on-Tyne. The senate and court of the university have accepted the proposal with gratitude. They have appointed Dr. J. C. Spence as professor. The council of King's College has announced that it will provide him with the assistance necessary for creating a full teaching and research department. The Royal Victoria Infirmary and the Babies' Hospital will cooperate with King's College by providing all possible facilities for the new department, which will be concerned with the preservation and restoration of the health of children. The department will provide undergraduate and postgraduate teaching in child health and the diseases of childhood. It will be a center of research and will be at the disposal of the public health and education authorities for advice and consultation in the conduct of their child welfare and school medical services. This is the first example of a chair of the kind in this country, though there have long been lecturers on pediatrics.

Red Cross Harvard Field Hospital Transferred to the American Army

At the beginning of the war, Harvard University made an offer to Britain of funds and workers for research in any field that might contribute toward winning the war. We replied that there was a need for a study of wartime epidemics. It was agreed to establish an organization with three distinct activities: (1) a hospital for patients with communicable diseases, (2) research laboratories for the study of clinical problems and epidemiology, (3) a field organization for studies in epidemiology. The American Red Cross Harvard Field Hospital Unit was therefore established in England in 1940. It represented a combination of American Red Cross work with research by Harvard University. It was provided, staffed and financed by the American Red Cross. Harvard provided the laboratory, and the British Ministry of Health prepared the site, erected the buildings and shared in the operating cost.

In January 1941 the field staff of the hospital was working on the control of epidemics in this country. In September 1941 the hospital admitted its first patients. Mobile units have covered a wide variety of infectious diseases in many parts of England, Scotland and northern Ireland. Last year a unit was in Bristol dealing with a paratyphoid outbreak, and recently one went to Glasgow in connection with an outbreak of smallpox there.

The entry of America into the war and the stationing of its troops in Britain has involved the provision of hospitals for them in this country. The American Red Cross Harvard Hospital has therefore been taken over by the American Army in Britain. It will be the central laboratory for the American forces. After the war the hospital will be turned over by the American Red Cross and Harvard University to the British Ministry of Health for the benefit of the people of Britain.

A Year's Vital Statistics

The Registrar General's Statistical Review for 1939 is in type, but because of the paper shortage it is not intended to put it on sale to the public as usual. Some copies have been printed for official use and are available on loan to persons having an acknowledged interest in vital statistics. An official summary shows that the number of live births during the year was 619,352, giving a birth rate of 14.9 per thousand persons living. This rate was 0.2 below that for 1938 and the same as that for 1937 and 0.5 above that for 1933, the lowest ever recorded. The death rate (excluding noncivilians from the outbreak of war in September) was 12.1 per thousand living, 0.5 above that for 1938 but 0.5 below that for 1937. When allowance is made for the fact that the proportion of old persons is increasing every year, the resulting corrected figure for the standardized death rate was 8.5, an improvement of 0.5 on the

previous best record, which was reached in 1935. The mortality of children under 1 year of age was 50 per thousand live births, the lowest on record and 3 below that for 1938, the previous best.

Mortality from infectious and parasitic diseases was 1.05 per thousand, an increase of 0.04 on the previous year, which was the lowest on record. The standardized death rate from tuberculosis fell to 595 per million of population, an improvement of 7 over the previous record. For pneumonia and nephritis the standardized rates for each sex showed substantial improvement. The cancer death rate, standardized for the increasing age of the population, decreased from 1,005 per million of the previous year to 989. Maternal mortality, including deaths from abortion, declined for the fifth year in succession, reaching a new low level of 2.47 per thousand live and still births. The rates for the five years 1934-1938 were respectively 3.78, 3.37, 3.16, 2.72 and 2.62. Thus the statistics for the national health in the year which includes the first four months of the war are very satisfactory.

Prof. C. R. Harington, F.R.S.

C. R. Harington, F.R.S., director of the Graham Laboratories and professor of pathologic chemistry, University College, London, has been appointed director of the National Institute for Medical Research in succession to Sir Henry Dale, president of the Royal Society. It is nearly twenty years since Professor Harington came to the Medical School of University College after working with Meakins, Burger and Van Slyke, and in that period a steady stream of research has flowed from the department of pathologic chemistry. His first ten years were mainly occupied with the chemistry of the thyroid gland, and within four years he published his classic paper on the synthesis of thyroxine, which placed him at once in the first rank. But he did not confine himself to purely chemical problems. In 1933 appeared his monograph on the thyroid, another classic, in which he stated with clarity and completeness the existing knowledge of the chemistry, physiology and functional pathology of the thyroid and made a forecast that the cause of hyperthyroidism would be found outside the thyroid, indicating the anterior lobe of the pituitary as the possible source of the stimulus. This view was received with some incredulity but was justified by the subsequent discovery of the thyrotropic hormone by Collip. In 1935 he synthesized gluthathionine and began a series of papers on the basis of immunology. No one is so completely fitted for his new post, most important in medical research in this country. The loss to University College of a man who not only was great as an original investigator but whose advice by all who were undertaking research was eagerly sought and freely given is much deplored.

Reform in the Teaching of Anatomy

In a joint communication to the *British Medical Journal*, five teachers of anatomy suggested a reduction in the amount of descriptive anatomic detail taught to students. This suggestion received support in correspondence which followed in the *British Medical Journal*. These teachers have now written again, saying that time in the curriculum is needed for a broad education in structural organization with its functional implications. Knowledge of the descriptive detail should be built on this. For example, it is far better that the student should learn the plan of the construction of nerve plexuses through an understanding of its nature than by memorizing a system of apparently arbitrary interconnections. There should be a sound knowledge of the differentiation and growth of tissues, and histologic detail should be studied concurrently with gross structure. In the last twenty years there has been some pruning in the teaching of descriptive detail, but much still remains to be done.

Physicians' Fees in Greece Paid in Kind

The Ankara correspondent of the *Times* reports that the famine in Greece is producing incongruous as well as tragic consequences. This is illustrated by an incident which arose between the Greek minister of health and the Medical Association of Athens. The association recently decided that, because of the severe depreciation of the Greek currency, medical fees should be paid not in money but in kind. On what basis the fee should be calculated was not determined. The minister of health objected that this decision was incompatible with professional decorum, but the association replied that even physicians must live.

BUENOS AIRES

(From Our Regular Correspondent)

Oct. 3, 1942.

Organize Board for Protection of Chilean Children

There is an annual birth rate of about 100,000 infants in Chile. About 25,000 mothers are delivered in maternity hospitals and 17,000 in their own homes. About 60,000 infants are properly nursed at home and 55,000 are nursed with the aid of reliable institutions. There are 400,000 children in the preschool age, 120,000 belong to well-to-do families and 7,000 or 8,000 have the aid of reliable institutions. There are about 900,000 children of school age. About 350,000 of these children belong to more or less rich families and about 48,000 have the aid and care of the medical department of the General Center of Public Health. Negotiations for organizing a board with the name of Consejo Superior de Protección a la Maternidad, a la Infancia y a la Adolescencia are in progress. It will be formed with members of the ministries of Public Health, Justice and Education and will carry on work for the health, social care and education of mothers, infants and adolescents. The Ministry of Public Health recently organized a Central Department of Health for mothers and children.

National Conference for Welfare of Children

The second National Conference for Welfare of Abandoned Children and Delinquent Youths was held on September 25 in Buenos Aires in celebration of the fiftieth anniversary of the foundation of the Patronato de la Infancia of Argentina. The topics discussed were laws for adoption of children, work of minors, establishment of centers for social guidance and care of children, money given to private social and educational institutions for children, vagrancy, special women inspectors and prevention of abandonment of children.

Crusade Against Malaria in Bolivia

An American sanitary mission will visit Bolivia in the near future with the aim of inaugurating a crusade against malaria in Bolivia. Dr. Eugene Payne will be at the head of the mission. Dr. Wendell S. Dove, substitute director of the Rockefeller office, will be a member.

Department of Sanitation

A department for propaganda and education on matters of sanitation was recently established in the Ministry of Public Health in Paraguay. Dr. Raul Peña was appointed head of the department.

Personals

Dr. Nicolás Romano, professor of clinical medicine of the Faculty of Medicine of the University of Buenos Aires, was recently appointed president of the Asociación Médica Argentina. —— An Argentine medical delegation was sent to the Chilean universities last May. Dr. León S. Morra, dean of the Faculty of Medicine of Córdoba, was the president of the delegation. —— Dr. Manuel Enrique Varela was recently appointed to the chair of embryology and histology at the Faculty of Medicine of the University of Buenos Aires to succeed the late Dr. Pedro Rojas.

Deaths

Joseph Clar Beck ✠ Chicago; College of Physicians and Surgeons, Chicago, 1895; in 1900 joined the department of laryngology, rhinology and otology at his alma mater, now known as the University of Illinois College of Medicine, where he had been associate professor of laryngology, rhinology and otology emeritus since 1932; a member of the American Board of Otolaryngology; specialist certified by the American Board of Plastic Surgery; chairman of the Section on Laryngology, Otology and Rhinology of the American Medical Association, 1919-1920; a member and past president of the American Laryngological, Rhinological and Otological Society, the American Academy of Ophthalmology and Otolaryngology and the American Bronchoscopic Society; member of the American Laryngological Association, the American Otological Society, Inc., the Society of Plastic and Reconstructive Surgery and the American Broncho-Esophagological Association; consultant for the Chicago League for the Hard of Hearing; fellow of the American College of Surgeons; during World War I served as a lieutenant colonel in the French division of the Czechoslovakian army in charge of American Red Cross Hospital number 113 at Cognac, France, and was later transferred to Prague, Czechoslovakia; lieutenant colonel in the medical reserve corps; appointed associate dean of education at the Illinois Eye and Ear Infirmary in 1940; consultant in the eye, nose and throat department of the Veterans Administration, Hines, Ill., from 1927 to 1938; for eighteen years attending surgeon in the ear, nose and throat department of Cook County Hospital; on the staffs of the Michael Reese, Henrotin and the Mount Sinai hospitals; in 1931 received a gold medal from the American Academy of Ophthalmology and Otolaryngology; author of "Fifty Years of Medicine," "Applied Pathology of Nose, Throat and Ear" and "Atlas of Radiology of Ear, Nose and Throat"; co-author, with Dr. Ira Frank, of "Stereoscopic Atlas of Plastic Surgery of Face, Head and Neck"; aged 72; died, October 20, of carcinoma.

Winfield Scott Hall, Berwyn, Ill.; Northwestern University Medical School, Chicago, 1888; head of the department of biology, Haverford (Pa.) College, from 1889 to 1893; professor of physiology from 1895 to 1919 and since then professor of physiology emeritus at his alma mater, where he had been junior dean from 1902 to 1913; lecturer on physiology at the Y. M. C. A. College, Chicago, from 1898 to 1917; exchange professor at the Université Internationale, Brussels, Belgium, from 1921 to 1927; gave health talks at military schools, academies and colleges under the auspices of the U. S. Public Health Service from 1919 to 1929; chairman of the Section on Pathology and Physiology of the American Medical Association, 1904-1905, and member of the House of Delegates in 1907; member of the American Physiological Society and the International Congress on Tuberculosis; president of the American Academy of Medicine, 1904-1905; lecturer on dietetics at the Mercy Hospital School for Nurses from 1896 to 1918 and the Wesley Hospital School for Nurses from 1903 to 1918; author of "Textbook of Physiology, Normal and Pathological" and "Nutrition and Dietetics"; aged 81; died, October 2, of uremia.

Herman Besser, New York; Bellevue Hospital Medical College, New York, 1897; member of the Medical Society of the State of New York and the American College of Radiology; specialist certified by the American Board of Radiology, Inc.; held the chair of electroradiotherapy at the New York Polyclinic Medical School and Hospital, 1905-1906; chief radiologist at the Washington Heights Hospital, 1914-1915, consultant to the Columbus Hospital; director of the x-ray department of the Jewish Memorial Hospital, 1915-1916; since 1932 attending roentgenologist to the Lutheran Hospital; formerly editor of the "Skiagraphic Atlas"; inventor of the Besser x-ray tube; aged 71; died, October 4, in the West Hill Sanitarium of coronary thrombosis.

Gilman Dubois Frost, Hanover, N. H.; Dartmouth Medical School, Hanover, 1892; Harvard Medical School, Boston, 1892; member of the New Hampshire Medical Society; lecturer of anatomy at his alma mater, 1893-1894, professor of anatomy from 1894 to 1910, secretary and treasurer of the school from 1896 to 1904 and secretary from 1904 to 1909; professor of clinical medicine from 1910 to 1937 and since then professor of clinical medicine emeritus; formerly attending physician on the staff of the Mary Hitchcock Memorial Hospital; aged 78; died, October 8, of arteriosclerosis.

Arthur John Huey ✠ New York; University and Bellevue Hospital Medical College, New York, 1902; assistant in laryngology from 1905 to 1910, instructor from 1910 to 1915 and since then lecturer at his alma mater, which is now known as the New York College of Medicine; consulting otolaryngologist for the U. S. Public Health Service; contract surgeon in the U. S. Army during World War I; aged 62; died, September 28, in the Park West Hospital of cirrhosis of the liver and ascites.

John Goldesbrough Meachem Jr., Racine, Wis.; Rush Medical College, Chicago, 1865; member of the State Medical Society of Wisconsin; for many years served as a member of the municipal board of health and as city physician; in 1932 donated a chapel and library to St. Luke's Hospital, of which he was one of the founders and for many years president of the hospital board of directors; aged 96; died, September 10, of arteriosclerosis.

Steuart Brown Muncaster ✠ Washington, D. C.; Georgetown University School of Medicine, Washington, 1885; formerly associate professor of ophthalmology at his alma mater; member of the American Academy of Ophthalmology and Otolaryngology; one of the founders of the District of Columbia Society for the Prevention of Blindness; aged 85; died, September 11, in the Episcopal Eye, Ear, and Throat Hospital of coronary occlusion.

Thomas Harrison Carmichael, Tufts College, Mass.; Hahnemann Medical College and Hospital, Philadelphia, 1886; chairman of the Committee on the Revision of Homeopathic Pharmacopeia of the United States in 1914 and 1936 and author of the preface in 1936; past president of the American Institute of Homeopathy; aged 84; died, October 9, in a hospital at Cincinnati as the result of injuries received in a fall.

John Watson Cathcart ✠ El Paso, Texas; Northwestern University Medical School, Chicago, 1903; specialist certified by the American Board of Radiology, Inc.; member of the American Roentgen Ray Society, Radiological Society of North America, Inc., American College of Radiology and the American Radium Society; veteran of the Spanish-American War; aged 64; died, September 13, of aplastic anemia.

Alfred Plummer Roope, Columbus, Ind.; Louisville (Ky.) Medical College, 1894; member of the Indiana State Medical Association; fellow of the American College of Surgeons; served overseas as a lieutenant colonel in the medical corps of the U. S. Army during World War I; aged 73; died, October 2, in the Veterans Administration Facility, Bay Pines, of cerebral hemorrhage.

Walter Prince Keene, Fontana, Calif.; Georgetown University School of Medicine, Washington, D. C., 1900; veteran of the Spanish-American War and World War I; formerly on the staff of the Veterans Administration Facility, Sawtelle; aged 72; died, September 4, in the Veterans Administration Facility, Fort Lyon, Colo., of cerebral hemorrhage and coronary sclerosis.

Louis Collins Johnson ✠ Brooklyn; Western Reserve University School of Medicine, Cleveland, 1914; clinical professor of medicine at the Long Island College of Medicine since 1941; on the staff of the Long Island College Hospital; aged 58; died, September 25, in the Brooklyn Hospital of subdural hematoma and postoperative circulatory collapse.

Samuel Eder Last ✠ Brooklyn; University and Bellevue Hospital Medical College, New York, 1921; specialist certified by the American Board of Urology, Inc.; member of the American Urological Association; on the staffs of the Evangelical Deaconess Hospital and the Greenpoint Hospital; aged 43; died, September 26, of coronary thrombosis.

Edward Burgin Shellenberger, Mountville, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1902; formerly on the staffs of the Warren (Pa.) State Hospital and the Danville (Pa.) State Hospital; aged 65; died, September 8, in the General Hospital of Monroe County, East Stroudsburg, of mesenteric thrombosis.

Richard West Cooney ✠ Erie, Pa.; Georgetown University School of Medicine, Washington, D. C., 1923; specialist certified by the American Board of Otolaryngology; chief of the department of otolaryngology, St. Vincent's Hospital; aged 47; died, September 22, of coronary thrombosis while moose hunting in northern Canada.

Hans Christian Ericksen, Soldiers Grove, Wis.; Minneapolis College of Physicians and Surgeons, 1907; served overseas as a captain in the medical corps of the U. S. Army during World War I; received the Croix de Guerre from the French government; aged 65; died, September 18, of bronchopneumonia.

Thomas Everett Bullard ✠ Schuylerville, N. Y.; College of Physicians and Surgeons, New York, 1895; served as health officer of the village of Schuylerville and the towns of Saratoga and Northumberland; for many years president of the board of education; aged 79; died, September 19, of arteriosclerosis.

John Christopher Grabau, Buffalo; University of Buffalo School of Medicine, 1914; member of the Medical Society of the State of New York; served in the medical corps of the U. S. Army during World War I; aged 53; died, August 16, of coronary thrombosis and hypertension.

Spencer Boyd McClary Sr., Etowah, Tenn.; Memphis Hospital Medical College, 1904; served overseas in the medical corps of the U. S. Army during World War I; examining officer for the county Selective Service System; aged 59; died, September 28, of coronary thrombosis.

Norman Briton Sowell ✠ Briarcliff Manor, N. Y.; Temple University School of Medicine, Philadelphia, 1926; surgeon and head of the medical assistant department of the Edgewood Park School, a junior college for girls; aged 43; died, October 3, of pulmonary infarct and endocarditis.

Edward Leroy Kannary, St. Paul; McGill University Faculty of Medicine, Montreal, Que., Canada, 1900; member of the Minnesota State Medical Association; aged 70; on the staff of St. Luke's Hospital, where he died, September 23, of carcinoma of the pancreas.

James Thomas Williams ✠ Wilkes-Barre, Pa.; Jefferson Medical College of Philadelphia, 1904; formerly pathologist, associate surgeon and chief surgeon at the Wilkes-Barre General Hospital; aged 64; died, September 30, of coronary occlusion, at his home in Kingston.

John Keller Griffith ✠ Slidell, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1907; formerly representative from the Sixth Congressional District; served during World War I; aged 59; died, September 25, of coronary thrombosis.

Ludwig Ilse, St. Petersburg, Fla.; Chicago College of Medicine and Surgery, 1912; member of the Illinois State Medical Society; veteran of the Spanish-American War; aged 69; died, September 8, of carcinoma of the prostate with metastases.

Jesse Earl King, Kilgore, Texas; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1910; served during World War I; aged 62; died, September 12, in a hospital at Dallas of malignant brain tumor.

Conrad G. Hoell, Camden, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1882; formerly a druggist; at one time member of the city board of education; aged 82; died, September 24, of cardiovascular renal disease.

Benjamin E. Cline, Strawberry Plains, Tenn.; University of Louisville (Ky.) Medical Department, 1894; member of the Tennessee State Medical Association; aged 72; died, September 10, in a hospital at Jefferson City of angina pectoris.

Walter Winfield Looney, Salem, Ore.; Willamette University Medical Department, Salem, 1906; aged 67; for many years on the staff of the Oregon State Hospital, where he died, September 14, of gastric hemorrhage and gastric ulcer.

Charles Taylor Robertson, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1939; captain in the Royal Canadian Army Medical Corps; aged 31; was killed while in active service in the Dieppe raid in France.

Charles Griffin Miller, Southport, Conn.; University of Buffalo School of Medicine, 1896; veteran of the Spanish-American War; aged 74; died, September 1, in St. Luke's Hospital, New York, of carcinoma of the rectum.

Bert Vivian Chance, Windfall, Ind.; Medical College of Indiana, Indianapolis, 1897; member of the Indiana State Medical Association; served overseas during World War I; aged 69; died, September 14, of coronary occlusion.

George Harris Boyer, Allentown, Pa.; University of Maryland School of Medicine, Baltimore, 1902; member of the Medical Society of the State of Pennsylvania; aged 76; died, September 16, of arteriosclerotic heart disease.

James S. Austin, Oak Ridge, Miss.; Kentucky School of Medicine, Louisville, 1878; at various times served as a representative in the state legislature; aged 86; died, September 19, of arteriosclerosis and cerebral hemorrhage.

Charles Nevers Raymond ✠ Providence, R. I.; College of Physicians and Surgeons, New York, 1877; an Affiliate Fellow of the American Medical Association; aged 88; died, September 19, of carcinoma of the tongue.

Willie B. Doughty, Berry, Ala.; Louisville (Ky.) Medical College, 1896; member of the Medical Association of the State of Alabama; aged 68; died, September 15, in the Druid City Hospital, Tuscaloosa, of acute septicemia.

Henry Stanley Hollenbeck, Milwaukee; Northwestern University Medical School, Chicago, 1907; for many years a medical missionary in Cuma, Angola, Africa; aged 64; died, September 16, in Chicago of pneumonia.

Percy Edward Whiffen ✠ McClure, Pa.; Medico-Chirurgical College of Philadelphia, 1911; past president of the Mifflin County Medical Society; aged 66; died, October 4, in the Lewistown (Pa.) Hospital of nephritis.

Eleanor Van Ness Van Alstyne, Woodstock, N. Y.; Cornell University Medical College, New York, 1916; aged 61; died, September 17, of lobar pneumonia and cerebral hemorrhage.

Robert C. Cunningham, Booneville, Miss.; Medical Department of Tulane University of Louisiana, New Orleans, 1892; aged 84; died, September 4, of chronic interstitial nephritis.

Robert Potts White, Jersey City, N. J.; Columbia University College of Physicians and Surgeons, New York, 1905; aged 63; died, September 15, of hypertensive heart disease.

Parker Myles Ward, Houlton, Maine; Harvard Medical School, Boston, 1898; member of the Maine Medical Association; aged 69; died, September 8, of coronary disease.

Hughes-Bayne Hoyle, Manteo, N. C.; North Carolina Medical College, Davidson, 1896; mayor of Manteo; aged 71; died, September 7, presumably of coronary occlusion.

George Anthony Davis, Stratford, Conn.; Jefferson Medical College of Philadelphia, 1903; aged 60; died, September 21, in New Haven of arteriosclerosis and hypertension.

Martin Casselman Rutherford, Rochester, N. Y.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1879; aged 86; died, October 5, of coronary occlusion.

Maxwell Tabacnic, St. Louis; St. Louis College of Physicians and Surgeons, 1907; aged 60; died, September 24, in the Missouri Baptist Hospital of ascending myelitis.

James Nelson Bartholomew, Santa Ana, Calif.; Medical College of Ohio, Cincinnati, 1882; aged 84; died, September 15, of chronic myocarditis and diabetes mellitus.

Robert E. Groce, Bernie, Mo.; St. Louis College of Physicians and Surgeons, 1909; aged 57; died, September 5, in Doniphan of cerebral hemorrhage.

Boley John Green, Drew, Miss.; Memphis (Tenn.) Hospital Medical College, 1908; aged 72; died, August 29, in Winter Park, Fla., of cirrhosis of the liver.

John F. Armentrout ✠ Roanoke, Va.; University of Maryland School of Medicine, Baltimore, 1903; aged 75; died, September 28, of heart disease.

Ernest Bland Van Arsdel, Louisville, Ky.; Louisville Medical College, 1903; aged 64; died, October 1, in St. Joseph Infirmary of pneumonia.

Steven Joseph Conway ✠ Chicago; Chicago College of Medicine and Surgery, 1917; aged 49; died, September 26, of heart disease.

Peter Campbell McEwen, Detroit; Detroit College of Medicine, 1895; aged 78; died, September 21, of cerebral hemorrhage.

Frank Ira Smith, Athens, Pa.; Jefferson Medical College of Philadelphia, 1889; aged 80; died, September 5, of coronary occlusion.

Robert Bagley Cralle Jr., Farmville, Va.; Medical College of Virginia, Richmond, 1931; aged 39; died, September 26.

George S. Barger, Purcell, Okla.; Marion-Sims College of Medicine, St. Louis, 1896; aged 67; died, September 15.

William Jonas Smothers, Cedarbluff, Miss.; Medical College of Alabama, Mobile, 1885; aged 83; died, August 28.

William L. Helsel, Scalp Level, Pa.; Eclectic Medical Institute, Cincinnati, 1896; aged 69; died, September 12.

Harvey W. Bodamer, Medina, N. Y.; University of Buffalo School of Medicine, 1906; aged 62; died, September 21.

Antoine Valentine Delaporte, Toronto, Ont., Canada; Trinity Medical College, Toronto, 1884; died recently.

DIED WHILE IN MILITARY SERVICE

Daniel John Hogan, Boston; Tufts College Medical School, Boston, 1920; member of the Massachusetts Medical Society; formerly assistant visiting physician at the Boston City Hospital; was commissioned a major in the medical reserve corps of the U. S. Army and was called to active service April 11, 1941; was stationed at the Tilton General Hospital, Fort Dix, N. J., where he died, August 15, of carcinoma of the sigmoid, aged 55.

Correspondence

THE CONDITIONED REFLEX TREATMENT OF ALCOHOLISM

To the Editor:—I read with considerable interest the articles on the treatment of chronic alcoholism by Lemere and others and by Miller in THE JOURNAL, September 26.

For the past ten years I have had gratifying success in producing cures of many years' duration in the treatment of chronic alcoholism by establishing a "conditioned reflex" under hypnosis. I wish to call attention to the successful use of suggestive therapy in the treatment of chronic alcoholism. The various combinations of suggestive therapy are used to speed up an otherwise slow process and are used to create an aversion to the sight, smell, taste and thought of alcohol.

Briefly, the following procedure is used: A state of heightened suggestibility is induced with deep hypnosis as it is scientifically applied in medicine. With the patient in a deep hypnotic state, the suggestion is made that he will be given a drink of whisky and that this drink will immediately induce nausea, vomiting and abdominal pain. Water is used instead of an alcoholic beverage, but the hallucinatory effect is real. Posthypnotic suggestions are given to the effect that at any time he attempts to take a drink the same nausea, vomiting and abdominal pain will be produced. Posthypnotic suggestions last about a month and, when repeated, the desired effect may become permanent, as has been previously pointed out by E. F. Patten and E. R. Kellogg (Duration of Posthypnotic Suggestion, *J. Abn. Social Psychol.* **25**:319, 1930; *J. Exper. Psychol.* **12**:502, 1929).

The deleterious effects of alcohol on the nervous system and body are impressed on the patient while he is in the deep hypnotic trance.

These suggestions are periodically reinforced through the induction of repeated posthypnotic states, which can even be produced over the telephone, after previous conditioning.

However, hypnosis is only a means toward speeding up the treatment, not the treatment itself, but when combined with modern psychoanalytic skill and knowledge it can be a much more effective shortcut in the treatment of chronic alcoholism than the ones described by Lemere and by Miller.

Alcoholism is merely the symptom of an underlying emotional or psychologic disturbance. It is true, as Miller states, that an attempt must be made to discover any mental conflicts, inhibitions, frustrations or personality changes that the individual may have. This is speeded up by hypnoanalysis, which is a rapid form of psychoanalysis under hypnosis (Hadfield, J. A.: Functional Nerve Disease, 1920. Karup, F.: Hypnoide Handlugen, *Ztschr. f. d. ges. Neurol. u. Psychiat.* **90**:638, 1924. Taylor, W. S.: Behavior Under Hypnoanalysis, *J. Abn. Psychol. & Soc. Psychol.* **18**:107, 1923). A regression technic described by K. I. Platonow (Experimental Age Regression, *J. Exper. Psychol.* **9**:190, 1933) is used. The patient is reverted to the age prior to the onset of his drinking and then slowly reorientated to the present. The development of harmful habit patterns, complexes and other mental problems will be found quickly. When the patient's consciousness is reeducated by intensive psychotherapy under hypnosis, many permanent cures may be effected readily.

WILLIAM S. KROGER, M.D., Chicago.

TOXICITY OF HUMAN PLASMA

To the Editor:—In the September 19 issue of THE JOURNAL in the last paragraph of the editorial on the toxicity of human plasma it is stated that "a negative skin test precludes the possibility of intravenous plasma shock." I consider this a rather dangerous statement and one with which my experiences and teachings do not agree.

In the search for allergic sensitivities one finds that all too frequently cutaneous tests are not a positive assurance that the substance tested for is, or is not, a sensitizing agent in that particular case. Thus one obtains positive tests, for example, to ragweed on persons whose history reveals no exacerbations or an entire lack of symptoms during the ragweed pollinating season. In these cases one can frequently apply ragweed pollen to the nasal mucous membrane or to the eye with completely negative results. On the other hand, persons giving a history of such a sensitization will definitely show symptoms when ragweed is applied in this manner and will also show symptoms on the ingestion of certain foods without showing any cutaneous sensitivity at all. Even a passive transfer fails to elicit a positive test.

It has been my experience that tests for normal horse serum act in the manner indicated. I have seen cases of shock result in persons who showed a negative test to normal horse serum. I have also seen persons who showed a definite positive cutaneous test to normal horse serum who did not have any reaction after the administration of products containing horse serum.

I think you will find that it is the consensus among allergists that there is a large percentage of persons whom we term "skin insensitive."

This does not mean that I think the intradermal tests are not valuable. They most certainly are, but I do not think such a hard and fast statement as that contained in the editorial is justified.

F. C. METZGER, M.D., Tampa, Fla.
Associate member of the Society for the Study of Asthma and Allied Conditions.

"FORCED SPINAL DRAINAGE"

To the Editor:—I should like to express a word of appreciation of the careful and fair editorial in your issue of September 26 on "Forced Spinal Drainage in Acute Poliomyelitis." The point which is made in the last paragraph is of particular significance since it is necessary to exercise caution in applying the results of the treatment of an intracellular virus to processes dependent on extracellular infectious agents.

At the same time I should also like to point out that the fundamental physicochemical aspects of the Retan technic are diametrically opposed to forced spinal drainage. The intravenous injection of hypotonic saline solution without concomitant free drainage of cerebrospinal fluid produces a generalized edema of the central nervous system. This is not lessened by giving the intravenous injections at intervals. The susceptibility of an edematous central nervous system to infection is no indication of the susceptibility of that same nervous system to infection during continuous formation and drainage of the cerebrospinal fluid. This limits the general significance of the experiments to which your editorial refers.

LAWRENCE S. KUBIE, M.D., New York.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

ANNUAL CONGRESS ON MEDICAL EDUCATION AND LICENSURE

CHICAGO, Feb. 15-16, 1943. Sec., Council on Medical Education and Hospitals, Dr. H. G. Weiskotten, 535 North Dearborn Street, Chicago.

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, Oct. 24, page 643.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 15-16. Sec., Dr. B. F. Austin, 519 Dexter Ave., Montgomery.

ARKANSAS:* *Medical.* Little Rock, Nov. 5-6. Sec., Dr. D. L. Owens, Harrison. *Eclectic.* Little Rock, Nov. 5. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), San Francisco, Dec. 16. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

CONNECTICUT:* *Medical. Written.* Hartford, Nov. 10-11. *Endorsement.* Hartford, Nov. 24. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, Nov. 10-11. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: Dover, July 13-15. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA:* Washington, Nov. 9-10. Sec., Commission on Licensure, Dr. George C. Ruhland, 6150 East Municipal Bldg., Washington.

FLORIDA:* Jacksonville, Nov. 23-24. Sec., Dr. William M. Rowlett, Box 786, Tampa.

HAWAII: Honolulu, Jan. 11-14. Sec., Dr. James A. Morgan, 48 Young Bldg., Honolulu.

IDAHO: Boise, Jan. 12. Dir., Bureau of Occupational Licenses, Mr. Walter Curtis, 355 State Capitol Bldg., Boise.

INDIANA: Indianapolis, Jan. 13-15. Sec., Board of Medical Registration and Examination, Dr. W. C. Moore, 301 State House, Indianapolis.

KANSAS: Topeka, Dec. 8-9. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, March 2-4. Sec., State Board of Health, Dr. A. T. McCormack, 620 S. Third St., Louisville.

MAINE: Portland, Nov. 3-4. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical.* Baltimore, Dec. 8-11. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 8-9. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 17-20. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413-F State House, Boston.

MISSISSIPPI: Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

NEBRASKA:* Lincoln, Nov. 23-25. Dir., Bureau of Examining Boards, Mrs. Jeannette Crawford, 1009 State Capitol Bldg., Lincoln.

NEVADA: Carson City, Nov. 2-4. Sec., Dr. Frederick M. Anderson, 215 N. Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 11-12. Sec., Board of Registration in Medicine, Dr. Deering G. Smith, State House, Concord.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 25-28. Chief, Bureau of Professional Examinations, Mr. H. L. Field, 315 Education Bldg., Albany.

NORTH CAROLINA: December. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 5-8. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: Columbus, December 2-4. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA:* Oklahoma City, Dec. 9. Sec., Dr. J. D. Osborn, Jr., Frederick.

OREGON: *Written.* Portland, January. Exec. Sec., Miss Lorienne M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia, January. Act. Sec., Bureau of Professional Licensing, Mrs. Marguerite G. Steiner, Department of Public Instruction, 358 Education Bldg., Harrisburg.

TEXAS: Austin, Dec. 28-30. Sec., Dr. T. J. Crowe, 918-20 Texas Bank Bldg., Dallas.

UTAH: Salt Lake City, June. Dir., Department of Registration, Mr. G. V. Billings, 324 State Capitol Bldg., Salt Lake City.

VERMONT: Burlington, March 25-27. Sec., Dr. F. J. Lawliss, Richford.

VIRGINIA: Richmond, Dec. 8-11. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WISCONSIN:* Madison, Jan. 12-14. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Tucson, Dec. 15. Act. Sec., Dr. Robert L. Nugent, University of Arizona, Science Hall, Tucson.

COLORADO: Denver, Dec. 16-17. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver.

MICHIGAN: Ann Arbor and Detroit, Feb. 12-13. Sec., Miss Eloise LeBeau, 101 N. Walnut St., Lansing.

NEW MEXICO: Albuquerque, Feb. 1. Sec., Miss Pia Joerger, State Capitol, Santa Fe.

OKLAHOMA: Oklahoma City, May. Sec., Dr. Oscar C. Newman, Shattuck.

RHODE ISLAND: Providence, Nov. 18. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH DAKOTA: Sioux Falls, Dec. 4-5. Sec., Dr. G. M. Evans, Yankton.

WISCONSIN: Milwaukee, Dec. 5. Sec., Prof. Robert N. Bauer, 152 W. Wisconsin Ave., Milwaukee.

Minnesota June Report

The Minnesota State Board of Medical Examiners reports the written examination for medical licensure held at Minneapolis, June 16-18, 1942. The examination covered 12 subjects and included 60 questions. An average of 75 per cent was required to pass. Sixty candidates were examined, all of whom passed. Three physicians were licensed to practice medicine by reciprocity and 2 physicians so licensed on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
College of Medical Evangelists		(1942, 2)	2
Yale University School of Medicine		(1938)	1
George Washington University School of Medicine		(1941)	1
Northwestern University Medical School		(1941, 2), (1942, 2)	4
Rush Medical College		(1938)	1
Indiana University School of Medicine		(1937)	1
University of Louisville School of Medicine		(1936)	1
Tulane University of Louisiana School of Medicine		(1939)	1
University of Michigan Medical School		(1938)	1
University of Minnesota Medical School		(1930), (1941), (1942, 8), (1942, 29)*	39
St. Louis University School of Medicine		(1942, 2)	2
University of Rochester School of Medicine and Dentistry		(1941)	1
University of Oregon Medical School		(1936)	1
Baylor University College of Medicine		(1939)	1
Marquette University School of Medicine		(1941), (1942, 2)	3

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
The School of Medicine of the Division of the Biological Sciences		(1938)	Wisconsin
Johns Hopkins University School of Medicine		(1940)	Maryland
University of Maryland School of Medicine and College of Physicians and Surgeons		(1936)	W. Virginia

School	LICENSED BY ENDORSEMENT	Year Grad.
University of Buffalo School of Medicine		(1938)
University of Pittsburgh School of Medicine		(1935)

* These applicants received the M.B. degree and will receive the M.D. degree on completion of internship.

Delaware July Report

The Delaware State Board of Medical Examiners reports the written examination for medical licensure held at Dover, July 14-16, 1942. The examination covered 11 subjects and included 110 questions. An average of 75 per cent in each subject was required to pass. Seven candidates were examined, all of whom passed. Two physicians were licensed to practice medicine by reciprocity. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Hahnemann Medical College and Hospital of Philadelphia		(1941, 2)	2
Jefferson Medical College of Philadelphia		(1941)	1
Temple University School of Medicine		(1941)	1
University of Pennsylvania School of Medicine		(1940), (1941)	2
Woman's Medical College of Pennsylvania		(1941)	1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Jefferson Medical College of Philadelphia		(1913), (1919)	Penna.

Iowa Reciprocity Report

The Iowa State Board of Medical Examiners reports 4 physicians licensed to practice medicine by reciprocity and 1 physician so licensed on endorsement of credentials of the National Board of Medical Examiners from March 10 through July 1. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Stanford University School of Medicine		(1914)	California
Rush Medical College		(1934)	Illinois
Johns Hopkins University School of Medicine		(1940)	Maryland
University of Minnesota Medical School		(1922)	Minnesota

School	LICENSED BY ENDORSEMENT	Year Grad.
College of Medical Evangelists		(1937)

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Osteopathy: Use of Drugs and Practice of Surgery Denied to Osteopaths.—The defendant Moore, a licensed osteopath, was charged with practicing medicine and surgery without a license in that he "prescribed and recommended, for a fee, drugs and medicines found in and comprising a part of materia medica" in at least two specific instances. The defendant Muecke, a licensed osteopath, was charged with practicing medicine and surgery without a license in that he performed surgical operations for the removal of tonsils in certain specific instances, used the title "physician and surgeon" in connection with his name and represented that he was engaged in the practice of medicine and surgery. Both defendants, by way of defense, alleged that they were duly licensed to practice osteopathy and that the doing and performing of the acts charged constituted the practice of osteopathy as taught and practiced in legally incorporated colleges of osteopathy of good repute. In each case the trial court sustained a motion to strike from the answer these allegations, and the defendants appealed to the Supreme Court of Kansas.

The issue in these cases was the same and they were argued together. Essentially, the court was presented with this question: Does a license authorizing the holder to practice osteopathy as taught in osteopathic schools confer the right to use drugs and to practice operative surgery? In answering this question, the Supreme Court reviewed its previous decisions involving the scope of osteopathy and well considered decisions in other jurisdictions and pointed out that all such decisions distinguish the practice of osteopathy from the practice of medicine and surgery. Referring particularly to the Kansas law, the court said that the words of a statute must be taken in the sense in which they were understood at the time the statute was enacted and that the effect of the words in the osteopathic act authorizing licentiates to practice "as taught and practiced in the legally incorporated colleges of osteopathy of good repute" was not to set at large the settled meaning of osteopathy and obliterate the distinction between the practice of osteopathy and the practice of medicine and surgery. Under the act, the examining and licensing board is authorized to grant certificates to practice osteopathy only to persons who have met certain requirements. Those who have not met these requirements and who have not graduated from an osteopathic school or college of good repute are not eligible to receive a certificate. The obvious purpose of the legislature, continued the court, was to exclude the unfit and thus protect the osteopathic profession as well as the public. The purpose was not to enlarge the meaning of osteopathy but to guard that profession from applicants who had graduated from schools of low standards that purported to teach osteopathy.

We have, the court said, set forth authoritative definitions of osteopathy. To be a reputable college of osteopathy within the meaning of the Kansas statute the course of study taught and practiced must conform to those definitions. The theory of the defendants that they may practice whatever might be taught in such schools cannot be sustained. To say that the scope of practice of an osteopath in Kansas is measured by what is or may be taught in osteopathic colleges of good repute would be the equivalent of saying that the law of Kansas fixing the boundary line between the practice of medicine and surgery and the practice of osteopathy must be determined by the shift in the subjects taught in an unknown number of colleges in an unknown number of states. The court could find no warrant for such a contention based on any proper construction of the statutes. Nor did the court agree with the contention that the proper construction of a statute is a question of fact for the jury, not a question of law for the court. If such a contention were true, the court pointed out, the law would be as chameleon hued as the various verdicts of successive juries.

The court concluded, therefore, that while the defendants were authorized to practice osteopathy they were not authorized to practice medicine and surgery, that the acts charged constituted the practice of medicine and surgery and that the trial court did not err in striking the defendants' answers, since those answers constituted a mere conclusion of law and were no defense to the acts charged. The court could find no authority in the Kansas law for the limited use of medicine and surgery contended for by the defendants and said that it was beyond the power of the court to write an exception into the statute, such an exception being a matter for the consideration of the legislature, not the courts. The order of the trial court in sustaining the motion to strike the answer, concluded the Supreme Court, was not an appealable order and the appeal was dismissed.—*State ex rel. Wheat, Co. Atty. v. Moore and State ex rel. Cobean, Co. Atty. v. Muecke, 117 P. (2d) 598 (Kan., 1941).*

Malpractice: Negligence of Osteopath in Treating Fracture of Humerus.—The plaintiff, on Dec. 24, 1937, fell and fractured the upper part of his right humerus. He was taken to the Cleveland Osteopathic Hospital and there attended by the defendant, an osteopath. A roentgenogram was taken which showed the break in the arm, and a traction device, known as a Thomas splint, was attached to the arm. Four days later another roentgenogram was taken, which disclosed a juncture of the bone fragments. The following day the osteopath applied a so-called airplane type plaster cast to the broken arm, which entailed raising the arm to a wing position and the application of plaster to hold the arm "in rigid fixation." However, the osteopath made no effort to set the broken bone because, as he stated, the patient's "entire constitutional system was bad" and that "further treatment along other lines" would be necessary before anything more could be done with the fracture. By the plaintiff's own testimony, however, it appeared that his physical condition was good at all times during his relationship with the osteopath. On December 30 the patient was discharged from the osteopathic hospital and told to return on January 18, at which time the cast would be removed and the arm placed in a sling. Further treatment of the arm was not given and fluoroscopic or roentgenographic examination was not made until January 12, when a roentgenogram taken on the order of the osteopath showed the ends of the fractured bone out of alinement and overlapping. It appears that at that time the osteopath was dismissed from the case and two days later the patient, at the direction of a nonsectarian physician, had other roentgenograms taken at another hospital. The physician then advised the plaintiff that an open operation would be necessary to secure a satisfactory union of the bone fragments. Whether that operation was ever performed the instant court decision does not make clear, but it does appear that the plaintiff suffered a substantial impairment in the use of his arm. The plaintiff subsequently brought suit against the osteopath for malpractice, alleging negligence and unskilfulness on the part of the osteopath principally in (1) so applying the Thomas splint as to cause unnecessary pain, (2) so applying the plaster cast as to cause the fractured portions of the right humerus to get out of alinement and (3) failing to make any observation or examination by roentgen rays to determine the position of the fractured bones after the attempt to reduce the fracture.

At the trial the patient called as a witness a nonsectarian physician who testified that the usual and common medical practice in the reduction and treatment of fractured human bones is to tire out the muscles surrounding the break by placing a weighted extension on the arm for several days or until swelling has subsided and then, by manipulation and with the aid of a fluoroscope or by roentgenograms, to attempt to get the bone fragments end to end or in apposition, whereupon a so-called airplane splint is ordinarily applied. This physician further testified that in his opinion the possibility of getting a meeting of the ends of the fractured bones in the case of the plaintiff, had they been set by this usual form

of manipulation under the fluoroscope or roentgen rays, was very favorable and that the fracture could have been set so that the ends contacted each other. The trial court, however, refused to permit the physician to answer a question as to whether or not he would be able to state from his examination of the roentgenograms taken at the osteopathic hospital on December 28, which showed the bones in contact, and from those taken at the second hospital on January 14, which showed the bones not in contact, what had caused the separation of the point of contact of the bones. The trial court's refusal was on the ground that the answer called for a conclusion that the jury would have to draw rather than one that the witness could properly draw. The plaintiff excepted, stating for the purpose of the record that the witness, if permitted to answer, would have testified that when the arm was turned back to a position upright with the head, which the osteopath did on December 28 in applying the airplane splint, the contact of the two bones was separated and caused to sideslip. At the close of the patient's evidence the trial court rendered judgment in favor of the osteopath, which action was affirmed by the court of appeals, Cuyahoga County, and the patient appealed to the Supreme Court of Ohio.

The plaintiff contended that the trial court erred in refusing to permit the medical witness just referred to to answer the question noted. The authorities, said the Supreme Court, are practically agreed that roentgenograms, with the technical aspects of which the ordinary layman is not familiar, may be interpreted and explained to a jury by qualified expert witnesses. And, while nonexpert witnesses are not usually permitted to express an opinion as to the cause of an occurrence involving an ultimate fact issue, experts in the particular field of inquiry may do so in certain cases. As was said in 20 Am. Jur. 686:

> The general rule is that opinions as to the cause of a particular occurrence or accident given by witnesses possessing peculiar skill or knowledge —that is, experts—are admissible where the subject matter is not one of common observation or knowledge, or, in other words, where witnesses because of peculiar knowledge are competent to reach an intelligent conclusion and inexperienced persons are likely to prove incapable of forming a correct judgment without skilled assistance.

As illustrative of this rule the court referred to *Pedigo* v. *Roseberry*, 340 Mo. 724, 102 S. W. (2d) 600, a malpractice action in which the court held that subjects of litigation not within general experience and common knowledge require the testimony of experts in such subjects for "the establishment of the ultimate fact." As we view it, said the Supreme Court, the patient was entitled to the benefit of the nonsectarian physician's opinion in response to the question referred to as an aid in sustaining the burden imposed on him of establishing negligence on the part of the osteopath and of showing a causal connection between the negligence and the claimed impairment of the arm. Of course, on cross examination, the accuracy and correctness of the physician's conclusion could be tested and the osteopath would have had the right to introduce other expert testimony, if he could, in contradiction. Considering the patient's evidence as a whole in the light most favorable to his contention, excluding the proper testimony of the nonsectarian physician which was rejected by the trial court, it discloses a situation wherein there was a contact of the broken bone fragments on December 28, a loss of such contact in the process of applying the airplane type splint and no further attention whatever given to the fracture by the osteopath for a period of two weeks. Coupled with this is the opinion of the nonsectarian physician that the break was of such a nature that it could have been originally set with good results in the usual and ordinary way. The court believed that the patient had made out a prima facie case against the osteopath, which should have required the latter to proceed with his evidence, and that the trial court was in error in rendering a judgment in favor of the osteopath at the conclusion of the evidence presented by the patient. The judgment in favor of the osteopath was accordingly reversed and the cause was remanded to the trial court for further proceedings.—*Hall v. Nagel, 39 N. E. (2d) 612 (Ohio, 1942).*

Drunkenness: Admissibility of Evidence of Blood Test.—The defendant was found guilty of operating a motor vehicle on the public highway while intoxicated and appealed to the Supreme Court of Iowa.

The defendant had consented to a blood test to determine the amount of alcohol present in his blood but on appeal contended that the trial court had erred in overruling his objections to certain questions propounded to the expert who made the test. This expert testified that he had found 400 mg. of alcohol per hundred cubic centimeters of blood and that a person with that much alcohol in his blood was intoxicated. He further testified, in response to a question, that 150 mg. of alcohol per hundred cubic centimeters of blood has been accepted by physiologists as the point at which an individual loses enough control over his nervous reactions to indicate that he is intoxicated. Objection was made to both the question and the answer. The Supreme Court held that the witness was competent, that the information called for by the inquiry was a proper subject for expert testimony and that the question was not objectionable as calling for a conclusion of the witness. In substance, the witness said that his statement that a person is intoxicated if he has 150 mg. or more of alcohol per hundred cubic centimeters of blood is an accepted scientific fact. Evidence was not introduced to the contrary and there was nothing in the record to show that the blood test given by the physician was not reliable and accurate on the question of intoxication.

The defendant called attention to the expert's testimony to the effect that it would be possible for a man to drink a quart of whisky in the course of four hours and not be intoxicated while another might drink only 2 ounces and lose control of his faculties; that a man is not intoxicated merely because he drank a quart of whisky. The expert explained, however, that the blood of a man who drank a quart of whisky would not necessarily show an alcoholic content of 400 mg.; it would not necessarily show more alcohol than one who drank a pint because of various other factors. The test of intoxication is not the amount of liquor consumed but the amount of alcohol in the blood. This testimony, said the court, is reconcilable with the prior testimony of the witness that any man with 400 mg. of alcohol in the blood is intoxicated.

The defendant also contended that an instruction given by the trial court authorized a conviction on the testimony of the expert without regard to any other evidence in the case. The Supreme Court held that this was not true. The evidence of the expert was admissible on the question of intoxication and was entitled to be considered by the jury. The trial court told the jury that it should take into consideration all of the testimony introduced in the case in determining the guilt or innocence of the defendant. Since the Supreme Court found no error, the judgment of conviction was sustained.—*State v. Haner, 1 N. W. (2d) 91 (Iowa, 1941).*

Society Proceedings

COMING MEETINGS

American Academy of Pediatrics, Chicago, Nov. 4-7. Dr. Clifford G Grulee, 636 Church St., Evanston, Ill., Secretary.

American Society of Anesthetists, New York, Dec. 10. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.

Annual Conference of Secretaries of Constituent State Medical Associations, Chicago, Nov. 20-21. Dr. Olin West, 535 North Dearborn St., Chicago, Secretary.

Association of Military Surgeons of the United States, San Antonio, Texas, Nov. 5-7. Colonel James M. Phalen, Army Medical Museum, Washington, D. C., Secretary.

New York State Association of Public Health Laboratories, Albany, Nov. 6. Miss Mary B. Kirkbride, New Scotland Ave., Albany, Secretary.

Puerto Rico, Medical Association of, Santurce, Dec. 11-13. Dr. E. Martinez Rivera, P. O. Box 3866, Santurce, Secretary.

Radiological Society of North America, Chicago, Nov. 30-Dec. 4. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.

Southern Medical Association, Richmond, Va., November 10-12. Mr. C. P. Loranz, Empire Building, Birmingham, Ala., Secretary.

Southern Surgical Association, Savannah, Ga., Dec. 8-10. Dr. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore

12:399-448 (Aug.) 1942

The Pathologist as a Physician. J. L. Lattimore, Topeka, Kan.—p. 399.
Recent Advances in Significance and Interpretation of Phosphatase Measurements in Disease. F. W. Sunderman, Philadelphia.—p. 404.
Serial Inoculation of Guinea Pigs for Demonstration of Mycobacterium Tuberculosis. J. E. Pottenger, Monrovia, Calif.—p. 412.
Studies on Platelets: II. Effect of Heparin on Platelet Count in Vitro. A. L. Copley and T. P. Robb, Kansas City, Kan.—p. 416.
Importance of Carbon Dioxide in Diagnostic Bacteriology with Observations on a Carbon Dioxide (Capneic) Incubator. S. B. Rose, Philadelphia.—p. 424.
Rh Blood Factor: Antigenic Analysis. I. Davidsohn and B. Toharsky, Chicago.—p. 434.

American Journal of Physiology, Baltimore

137:1-246 (Aug.) 1942. **Partial Index**

Contraction Potentials (Right Quadriceps Femoris) in Man During Reading. E. Jacobson and F. L. Kraft.—p. 1.
Depression of Gastric Motility Without Elevation of Body Temperature Following Injections of Pyrogens. H. Necheles, P. Dommers, M. Weiner, W. H. Olson and W. Rychel, Chicago.—p. 22.
Secretion of Renin by Intact Kidney. F. Huidobro and E. Braun-Menendez, Buenos Aires, Argentina.—p. 47.
*Prophylactic Action of Desoxycorticosterone in Shock Due to Massive Venous Thrombosis. L. N. Katz, S. T. Killian, R. Asher and S. Perlow, Chicago.—p. 79.
*Production of Experimental Polycythemia in Man by Daily Administration of Amphetamine Sulfate. J. E. Davis and A. M. Harris, Little Rock, Ark.—p. 94.
Effect of Lymphatic Block on Bile Resorption in Obstructive Jaundice. B. G. P. Shafiroff, H. Doubilet, W. F. Ruggiero, A. P. Preiss and Co Tui, New York.—p. 97.
Role of Anterior Pituitary in Adrenalin Hyperglycemia and Liver Glycogenolysis. R. C. de Bodo, H. I. Bloch and I. H. Gross, New York.—p. 124.
Effect of Hydrochloric Acid on Pyloric Sphincter, Adjacent Portions of Digestive Tract and on Process of Gastric Evacuation. J. P. Quigley, M. R. Read, K. H. Radzow, I. Meschan and J. M. Werle, Cleveland.—p. 153.
Acclimatization to Low Oxygen Tensions in Relation to Gastric Emptying. J. C. Stickney and E. J. Van Liere, Morgantown, W. Va.—p. 160.
Transmission of Radioactive Iron to Human Fetus. W. T. Pommerenke, P. F. Hahn, W. F. Bale and W. M. Balfour, Rochester, N. Y.—p. 164.
Utilization by Rat of Vitamin A Administered Perorally and Intramuscularly. O. W. Barlow and H. Kocher, Rensselaer, N. Y.—p. 213.
Bulbar Projection of Trigeminal Nerve. W. A. McKinley and H. W. Magoun, Chicago.—p. 217.
Prolonged Action of Histamine. C. F. Code, Rochester, Minn., and R. L. Varco, Minneapolis.—p. 225.
Normal Human Arterial Oxygen Tension. S. C. Cullen and Evelyn V. Cook, Iowa City.—p. 238.

Desoxycorticosterone Prophylaxis for Shock.—Katz and his associates determined the prophylactic and therapeutic action of desoxycorticosterone on occlusion of the venous return from one limb of the dog, which usually results in massive edema of that limb, shock and death. Fifteen control dogs received no desoxycorticosterone, 11 primed dogs received an average of 25 mg. in divided doses during the twenty-four hours preceding the operation and 35 mg. during the following twenty-four hours, 3 unprimed dogs received an average of 40 mg. of the drug starting two hours after the operation and continued for twelve hours and 6 dogs received 10 mg. ten minutes to two and a half hours preoperatively and an average of 36 mg. during the following twelve hours. Of the control dogs 2 survived and the others died in shock within three and a half to twenty-one hours. Although the occluded limbs became cold and severely edematous, the primed dogs appeared normal, drank water and were in good condition. Two of these animals given a smaller quantity of the drug preoperatively died in shock in four and a half and twenty-nine hours. One dog with distemper died in twelve hours from pulmonary edema. The blood pressure in the 8 dogs that survived remained unchanged or was slightly reduced. Hemoconcentration was evident during the first several postoperative hours but returned toward normal the following day, followed in some by a long period of hemodilution, which was coincident with a gradual return of the edematous leg to normal. Seven of the unprimed dogs died in shock, 1 died of pneumonia and 1 survived. Desoxycorticosterone may not be efficacious in other forms of shock. Desoxycorticosterone might operate in one or more ways: (1) by maintaining normal capillary permeability or by controlling fluid exchange between blood and tissues, (2) by altering and controlling the water balance, (3) by operating directly on the cardiovascular system or (4) by counteracting the release of a toxic agent from the edematous limb.

Amphetamine Sulfate and Polycythemia in Man.—Davis and Harris observed the effect of daily administration of amphetamine sulfate on producing polycythemia in 6 healthy men. The erythrocytes were increased 12 to 15 per cent in 5 of the 6 men within one to two weeks after the drug had begun to be taken. Hemoglobin percentages were increased proportionately. Total leukocyte counts remained fairly constant. When the ingestion of the amphetamine was stopped the erythrocyte count returned to normal in six to fourteen days. The erythrocyte count of the sixth man remained constant, around six million. Blood pressure, particularly the diastolic (about 6 mm.), was increased uniformly one to four hours after the drug was ingested by 4 of the 6 men during the first few days of ingestion. In the man in whom polycythemia did not develop there also was no uniform blood pressure response. The results are explained by assuming that amphetamine sulfate increases hemopoiesis by causing a local hypoxia of bone marrow through a diminution of the blood supply to this tissue.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

48:141-282 (Aug.) 1942

Angiocardiography in Congenital Heart Disease: I. Dextrocardia. M. F. Steinberg, A. Grishman and M. L. Sussman, New York.—p. 141.
Pleural Lesions in Hemophilia: Report of Case. E. P. Pendergrass and E. B. D. Neuhauser, Philadelphia.—p. 147.
*Pleural Effusion and Ascites in Association with Fibroma of Ovary (Meigs's Syndrome). M. Ritvo, Boston.—p. 152.
Gastric and Duodenal Ulcer Associated with Lesions of Lower End of Esophagus and Cardia of Stomach. F. Huber and L. H. Andreson, New York.—p. 158.
Adenocarcinoma of Ileum. J. M. Flynn, Rochester, N. Y.—p. 163.
Mesenteric Cysts: Their Roentgen Diagnosis. C. L. Hinkel, Harrisburg, Pa.—p. 167.
Pancreas Seen Through Gastric Ulcer. E. Vio, Shanghai, China.—p. 177.
Venereal Lymphogranulomatous Rectal Stricture. M. Helper, Evansville, Ind., and D. E. Szilagyi, Detroit.—p. 179.
Carcinoma of Breast: Report of Case Treated by Surgery and Irradiation; Seventeen Years' Duration. A. W. Jacobs, New York.—p. 191.
Three and Five Year End Results in Treatment of Carcinoma of Cervix at the American Oncologic Hospital. G. A. Hahn, Philadelphia.—p. 195.
Radiation Osteitis and Fractures Following Irradiation: Report of Five Cases of Fractured Clavicle. D. P. Slaughter, New York.—p. 201.
*Radium in Treatment of Hongkong Foot. H. C. Vassiliadis, Athens, Greece.—p. 213.
Is the Action of Roentgen Rays Direct or Indirect? Investigation of This Question by Method of Human Marrow Culture. E. E. Osgood, Portland, Ore.—p. 214.
Photoelectric Timing Mechanism for Automatic Control of Roentgenographic Exposure. R. H. Morgan, Chicago.—p. 220.
Study of Digestive Phenomena in Snakes with Aid of Roentgen Ray. A. W. Blain and K. N. Campbell, Detroit.—p. 229.

Pleural Effusion and Ascites with Fibroma of Ovary.—According to Ritvo, Meigs's syndrome should be considered in all obscure cases of fluid in the cavity of the chest. If the condition is recognized, a favorable prognosis can be given. With an incorrect diagnosis of malignant disease the patient is subjected to needless mental and physical suffering, to many tappings of the pleural and peritoneal cavities for recurrent formation of fluid and to radiation therapy. Why the fluid recurs is not understood. It is a transudate with a specific gravity of about 1.015. Tapping is without effect. Operative removal of the pelvic mass results in complete and permanent cure without further reaccumulation of fluid. Irradiation is not indicated. It appears that this condition is relatively common

and that many unrecognized cases exist. The clinical manifestations are discussed and 2 instances of ovarian fibroma recently observed by the author are reported. The diagnosis of the condition of the first patient was confirmed by pathologic findings and the patient was completely cured by operation. The second patient, observed for three years, has typical roentgen and clinical changes, but she has refused surgical operation because of her advanced age, 70 years.

Radium for Hongkong Foot.—Eighty-two patients with Hongkong foot, a common fungous disease in China, have been given radiation treatment by Vassiliadis: 2 mg. tubes of radium were filtered through 1 mm. of platinum and were applied with plaster on the skin at 1 cm. distance for forty-eight hours. The dose delivered is large enough to cause cutaneous desquamation in fifteen to twenty days, with complete healing within a month. Success depends on the disinfection of socks by boiling and of shoes by formaldehyde powder. If the patient can afford it, new shoes are advised. Eighty patients were cured after one treatment and have remained so after two to five years. Two patients were advised to have a second treatment, and the 1 who took it was cured. The other did not take the second treatment because the condition no longer bothered him much. Epidermophyton rubrum, Epidermophyton inguinale, Trichophyton interdigitale, Trichophyton pedis and a few other species have been isolated from Hongkong foot.

Archives of Internal Medicine, Chicago

70:183-346 (Aug.) 1942

*Staphylococcic Pneumonia Occurring During an Epidemic of Influenza. M. Finland, O. L. Peterson and E. Strauss, Boston.—p. 183.
*Exophthalmos in Patients with Various Types of Goiter. M. H. Soley, San Francisco.—p. 206.
Unusually High Insulin Requirements in Diabetes Mellitus: Report of Case. W. I. Glass, C. L. Spingarn and H. Pollack, New York. —p. 221.
Neuropsychiatric Disturbances in Internal Disease: Metabolic Factors and Electroencephalographic Correlations. G. L. Engel, Cincinnati, and S. G. Margolin, New York.—p. 236.
*Vascular Phase of Chronic Diffuse Glomerulonephritis: Clinicopathologic Study. H. Horn, P. Klemperer and M. F. Steinberg, New York.—p. 260.
*Pyelonephritis and Hypertension: Study of Their Relation in 11,898 Necropsies. N. M. Shure, Chicago.—p. 284.
Intermittent Fever of Unknown Origin: Recurrent High Fever with Benign Outcome in Patient with Migraine and Notes on "Neurogenic" Fever. S. Wolf and H. G. Wolff, New York.—p. 293.
Diseases of Heart: Review of Significant Contributions Made During 1941. A. Graybiel, with editorial assistance of P. D. White, Boston. —p. 303.

Staphylococcic Pneumonia During Epidemic of Influenza.—In the course of the epidemic of influenza which had occurred during the late fall and early winter of 1940-1941, had involved most sections of the United States, the Hawaiian Islands, Puerto Rico and probably many other areas and which had reached Boston late in December and persisted throughout January, there were encountered, according to Finland and his co-workers, 66 cases of complicating staphylococcic pneumonia. Predominantly the infection was due to influenza A virus. As for the pneumonia the predominant organism obtained from one or more cultures of sputum or from the lungs was Staphylococcus aureus. Symptoms suggesting pulmonary infection began on the same day as those of the influenza in about one third of the cases, within five days in another third of the cases and were delayed six days to three weeks in the rest. All the patients included in the report were 14 or more years of age. However, infants and children with the infection were treated in the hospital during this period; some of the infants died. Among the 66 adults there occurred 21 deaths predominantly of patients more than 60, but the fatalities in the acute fulminating infections occurred mostly in middle aged people. Actually the mortality probably was lower, as many more cases of influenza with pulmonary minimal signs might have been included had more complete bacteriologic studies been made. All but 6 patients were treated with one or more of the sulfonamides. Usually the dose was 1 Gm. every four hours during most of the febrile stage and either 6 or 4 Gm. daily for a few days thereafter. Treatment in the severe cases was continued for one to four weeks. In 4 of the 6 cases of empyema complete recovery under chemotherapy occurred after one or more thoracenteses and did not require surgical drainage. The occurrence of sterile pleural effusions in severe infection with recovery and the low fatality in cases with positive blood cultures are further indications of the efficacy of the drug in these infections. The exact role of the staphylococcus was difficult to evaluate, but the high incidence of abscesses of the lung, of empyema and of bacteremia associated with pure cultures of staphylococcus is strong evidence that this organism played an important role in the pulmonary infection. The staphylococcic pulmonary infection may vary from simple tracheobronchitis with minimal pulmonary involvement to a fulminating acute and fatal hemorrhagic and edematous pneumonia or a chronic organizing pneumonia with bronchiectasis and multiple abscesses. A brief course of treatment with sulfadiazine or sulfathiazole is suggested for severe uncomplicated influenza when patients harbor many pathogenic staphylococci or hemolytic streptococci or when these organisms are known to be prevalent in a community.

Exophthalmos and Goiter.—Exophthalmos occurs in diseases other than of the thyroid. Soley limits his discussion to that which occurs in certain diseases of the thyroid. One of the reasons for confusion as to the presence or absence of exophthalmos has been the failure of many clinicians to distinguish "stare," or retraction of the upper (and perhaps the lower) lid, from protrusion of the eyeball. Several other situations may give rise to a false impression of exophthalmos: lid lag associated with unilateral ptosis of an upper eyelid and overaction of the contralateral levator palpebrae superioris causing lid lag in the opposite eye. Exophthalmos can be confirmed only by careful observation and by actual measurement with the Hertel exophthalmometer. The measurements of eyes of 65 normal persons, of 106 with toxic diffuse goiter, of 52 with toxic nodular goiter, of 55 with nontoxic nodular goiter and of 2 before and after unilateral paralysis of the cervical sympathetic ganglions are presented by the author. According to his studies, eyes of more than 50 per cent of patients with toxic diffuse goiter become measurably more prominent after subtotal thyroidectomy; they become less prominent in only a few. These observations are contrary to the opinion of most surgeons who have relied on clinical impressions as to the state of exophthalmos before and after treatment. Loss of the stare associated with hyperthyroidism does not necessarily mean a decrease in exophthalmos. The eyes of thyrotoxic patients treated by roentgen rays show less tendency to increase in prominence. Therefore, for patients with hyperthyroidism in whom exophthalmos is severe, roentgen therapy is more desirable than surgical subtotal thyroidectomy. Treatment of these particular patients should be directed toward preventing malignant exophthalmos.

Vascular Phase of Chronic Diffuse Glomerulonephritis.—Horn and his associates studied the vascular phase of 49 consecutive cases of chronic diffuse glomerulonephritis selected from 5,232 necropsies. Specimens were fixed in a 40 per cent solution of formaldehyde U. S. P., Kaiserling I solution or Jores solution. Sections of the kidneys, pancreas, adrenals, testes, myocardium and all other available organs were diligently examined. In accordance with the varied vascular picture the disease was divided into a slowly progressive and an accelerated phase, there being 14 cases of the former and 35 of the latter. The intimal fibrosis, elastosis of arteries and arteriolar hyalinization, which were characteristic vascular alterations in the slowly progressive group, were observed also in others. A transitional group in addition exhibited cellular proliferation, foam cells and edema of the arterial intima, while in the advanced accelerated group an even more conspicuous cellular intimal proliferation of the arterial tree and necrosis of the arteriolar walls were present. In most cases the intensity of the clinical picture usually paralleled the anatomic vascular changes. Neuroretinitis, common in the transitional and the advanced accelerated group, was never observed in the slowly progressive group. It is concluded that arterial alterations both in the transitional and in the advanced accelerated cases of chronic diffuse glomerulonephritis represent the anatomic equivalents of malignant hypertension. This occurred more frequently than is suspected in chronic diffuse glomerulonephritis. The constancy of severe hypertension in a miscellaneous group of diseases with accelerated arterial changes is considered a potent etiologic force in their production. The clinical course of chronic diffuse glomerulonephritis may be influenced not only by the exacerbation of the inflammatory process but by

the height of the blood pressure. The occurrence of severe hypertension and neuroretinopathy in various disease entities vitiates the belief that these criteria may be of differential diagnostic import. The vascular lesions once established cause the renal process to advance and intensify the clinical picture.

Pyelonephritis and Hypertension.—Shure correlates the incidence of hypertension (150 mm. systolic and 95 diastolic) and pyelonephritis in 11,898 consecutive necropsies. To complete the study he also studied the records of patients with hydronephrosis, nephrolithiasis and horseshoe kidney. There were 290 patients with pyelonephritis, in 224 of whom the condition was bilateral. There were 130 females and 160 males. Of the 88 patients more than 60 years of age, 69 were men and 19 were women. The preponderance of males in the total number is made up mainly of those in the older age groups. It can almost be assumed from the figures that fewer women survive pyelonephritis. It is likely that young women die of the disease in the acute stage. The incidence of pregnancy in these women was not ascertained, but the great preponderance of the disease in women of childbearing age is significant. Forty-four and four-tenths per cent of all the patients regardless of age, sex and race had an elevated blood pressure. From 28 per cent in those aged 30 or less the incidence rises in direct proportion to age until it reaches 63 per cent in those more than 60 years of age. Similarly, the incidence of renal vascular changes is completely parallel with that of hypertension. In small groups of patients with polycystic kidney, horseshoe kidney and uncomplicated nephrolithiasis the respective incidence of hypertension was 46.15, 64.7 and 53.25 per cent. The increase of hypertension with age may possibly be explained by the frequency with which high blood pressure occurs in elderly persons even without renal damage and therefore pyelonephritis is not an important factor in the production of their hypertension and by the fact that the occurrence of a much greater incidence of hypertension in the older age groups is in complete accord with the concept that the time element (duration of the renal infection) is important in the evolution of the hypertension associated with pyelonephritis.

Journal of Pediatrics, St. Louis

21:147-288 (Aug.) 1942

*Pneumoencephalography and Developmental Diagnosis of Behavior: Analysis of Fifty-Three Cases of Cerebral Pathology. Catherine S. Amatruda, New Haven, Conn.—p. 147.

*Salicylate Prophylaxis in Rheumatic Fever. A. F. Coburn and Lucile V. Moore, New York.—p. 180.

*Bacteriologic and Chemotherapeutic Studies in Acute Diarrhea of Infants and Children. S. R. Halpern, with technical assistance of Josephine Cunningham, Dallas, Texas.—p. 184.

Gastrointestinal Allergy and Celiac Syndrome. R. H. Kunstadter, Chicago.—p. 193.

*Treatment of Influenzal Meningitis with Anti-Influenzal Rabbit Serum and Sulfapyridine. J. P. Scully and Maud L. Menten, Pittsburgh. —p. 198.

Nonspecific Serologic Reactions for Syphilis in Infants and Children. A. Hill, Boston.—p. 207.

Bismuth Lines of Long Bones in Relation to Linear Growth. L. A. Russin, H. E. Stadler and P. C. Jeans, Iowa City.—p. 211.

Salicylate Intoxication in Infants and Children. H. L. Barnett, J. R. Powers, J. H. Benward and A. F. Hartmann, St. Louis.—p. 214.

Nitrobenzene Poisoning: Report of Case Due to Exterminator Spray. A. Stevenson and R. P. Forbes, Denver.—p. 224.

Hereditary Ectodermal Dysplasia of Anhydrotic Type: Report of Two Cases. H. Stadler and C. H. Blackstone, Iowa City.—p. 229.

Hodgkin's Disease in Infant: Report of Case with Peculiar Peripheral Blood Picture. J. L. Schwind and G. Martina Hyde, Albany, N. Y. —p. 238.

Heredity and Genetics. W. C. Davison, Durham, N. C.—p. 246.

Pneumoencephalography and Behavior.—From the outpatient and consulting service of the Yale Clinic of Child Development, Amatruda collected 53 children with cerebral pathologic changes in whom it was possible to correlate the findings of the developmental examination with those of pneumoencephalography. The cases fell into the following classification: congenital malformations and aplasias, cerebral degenerative disease, epilepsy, hydrocephalus, cerebral injury, postmeningitis and postencephalitis. In the group are 11 patients whose development has proceeded normally in spite of indisputable roentgen evidence of cortical atrophy: 1 child recovered from meningitis (organism unknown), 2 have a communicating hydrocephalus and 8 are epileptic. Pneumoencephalography is a major procedure and should not be done if a simpler procedure will suffice. The usefulness of pneumoencephalography in many pediatric conditions is not denied, but its limitations need reaffirmation. It is invaluable in locating intracranial tumors and in establishing the obstructive nature of a hydrocephalus. It is useful in the diagnosis of congenital cerebral malformations. It establishes an anatomic diagnosis. It does not picture the functional capacity of the cerebrum except when this capacity can be inferred from structural defects. Dilatation of the ventricles and widened cerebral sulci do not necessarily indicate any alteration in cerebral function or any diminution in developmental potentialities. In pediatric conditions involving developmental factors the developmental examination of behavior status measures function. Depending on the complicating factors, it also indicates the future capacities for growth and development. Behavior is the final criterion of the functional integrity of the central nervous system.

Salicylate Prophylaxis in Rheumatic Fever.—The prophylactic value of acetylsalicylic acid was investigated by Coburn and Moore in 47 rheumatic children living in overcrowded tenements of New York City and exposed to the prevalent respiratory infections. The data are for a two year study. The subjects under observation were requested to report at the onset of pharyngitis, when salicylate therapy was instituted and throat cultures were obtained. If the cultures contained the hemolytic streptococcus group A, prophylaxis was continued for four weeks. The daily dosage was 4 to 6 Gm., depending on the size of the patient. If the cultures contained a respiratory pathogen other than the hemolytic streptococcus, salicylates were discontinued and the patients omitted from the study (in none of this group did rheumatic fever develop). Patients who contracted streptococcic pharyngitis and failed to report during phase I were observed as a control group. All but 1 of the 47 quiescent rheumatic subjects treated with sodium salicylate following hemolytic streptococcic pharyngitis escaped clinical manifestations of rheumatic fever. It was possible that prophylaxis in this boy had not been carried out as advised. Fifteen patients in the group had a brief asymptomatic rise in the erythrocyte sedimentation rate within a few days after prophylaxis was discontinued; however, symptoms or signs of rheumatic activity did not develop in any of them. The expected occurred in the untreated control patients: in 57 of 139 who contracted pharyngitis, rheumatic fever developed. In the untreated patients the antistreptolysin curves were like those which follow hemolytic streptococcus infections. Likewise typical antistreptolysin titer curves developed in the treated patients; about one half of them showed a late rise similar to that described in rheumatic fever. Statistical treatment of the data indicates that the failure of rheumatic fever to develop after salicylate prophylaxis following streptococcic pharyngitis is significant.

Bacteriologic and Chemotherapeutic Studies in Acute Diarrhea.—The results of therapy with sulfathiazole and sulfaguanidine in acute diarrhea are reported by Halpern, who cared for 63 such children; 39 were less than 1, 20 between 1 and 2 and 4 between 2 and 5 years of age. During the child's hospitalization at least three stools were obtained for microscopic examination and culture. For culture studies SS agar was the best medium. The diagnosis in 47 was bacillary dysentery and in 16 nonspecific diarrhea. Of the 47, 23 were given sulfathiazole orally; an initial dose of ½ grain (0.032 Gm.) per pound of body weight was followed by 1 grain (0.065 Gm.) per pound for each twenty-four hours divided into six equal doses. Sulfathiazole was usually discontinued twenty-four hours after the stools were normal. There was no evidence of toxicity. The results were good in all. The temperature dropped to normal within twenty-four to thirty-six hours, and the toxicity disappeared. Usually the stools were of good consistency and normal in number in five days. Sulfaguanidine was administered to 13; the first 5 received the same dose as that described for sulfathiazole and 8 an initial dose of ¾ grain (0.05 Gm.) per pound of body weight, followed by a maintenance dose of 2½ grains (0.16 Gm.) for twenty-four hours divided into six equal doses. There were no unfavorable reactions. The course of the disease was similar to that following sulfathiazole therapy. Stools were normal in five and four-tenths days. Several children with severe secondary infection responded well to sulfaguanidine. Any concurrent infection improved as the diarrhea

ceased. Eleven mildly or moderately ill children received no specific therapy. Their temperature (100 to 101 F.) remained elevated for several days, and fluids parenterally were necessary for a longer time than in those receiving chemotherapy. Stools were usually normal in six and three-tenths days. There were no complications.

Treatment of Influenzal Meningitis.—During the year ended September 1941, Scully and Menten treated 9 patients suffering with influenzal meningitis; 5 recovered completely. All were treated with type B anti-influenzal rabbit serum and a sulfonamide drug, and some also received the sodium salt of hydroxyethylapocupreine hydrochloride intrathecally. The death of 1 of the 4 patients who lived for more than four days after treatment was begun was due to drug nephritis and not to the meningitis. An associated mastoiditis, present in 5 of the patients, unfavorably influenced the patient's chance of recovery, especially if mastoidectomy was delayed. The anti-influenzal rabbit serum improved the prognosis. The meningeal irritation which followed the intrathecal use of the serum, indicated by a prompt increase in the cerebrospinal fluid cell count, raised the question as to whether intraspinal injection is justifiable or whether the intravenous route may not be preferable. Intrathecal use may be conducive to the further formation of fibrinous exudate in the pia-arachnoid. In patients who readily responded favorably to the serum the spinal fluid became culturally negative in four to six days. However, fever sometimes persisted for six to fifteen days after serum therapy was instituted. A recurrence of symptoms after a period of quiescence should immediately suggest an unresolved focus of infection, especially in the mastoid or middle ear. An associated mastoiditis was apparently the precipitating factor in the death of 3 of the patients, and a grave complication in 2 who recovered. The low diffusibility of sulfathiazole and the fact that crystals of it may appear in the kidney would indicate preference for sulfanilamide and sulfapyridine. The appreciable reduction of the cerebrospinal fluid cell count following the use of either of them in the absence of serum indicates that they may be a valuable adjunct to serum treatment. Their use in conjunction with serum has not materially lessened hospitalization or convalescence. The bacteriostatic value of the sodium salt of hydroxyethylapocupreine hydrochloride intrathecally in 4 patients was problematic.

New Jersey Medical Society Journal, Trenton

39:415-464 (Aug.) 1942

Epidemiology in Wartime. J. A. Bell, Bethesda, Md.—p. 419.
Early Diuresis in Congestive Heart Failure. C. L. Andrews, Atlantic City.—p. 424.
*Abdominal Pain of Urologic Origin in Children. M. F. Campbell, New York.—p. 427.
Syphilis of Nose and Mouth. O. R. Kline, Camden.—p. 432.
Osteomyelitis of Skull. R. Pomeranz, Newark.—p. 436.
Anginal Pain Due to Adhesive Pericarditis. L. A. Eigen and A. R. Abel, West Orange.—p. 439.
"Argyria" in Young Female Due to Overadministration of Colloidal Silver Preparation: Case. M. H. Gordon, Camden.—p. 441.
Fact, Functional or Fake: Neuropsychiatric Problem of the Army. J. A. Brussel, Fort Dix.—p. 442.

Abdominal Pain of Urologic Origin in Children.—For the clinical background of abdominal pain of urologic origin, Campbell used the records of 213 children personally given a complete urologic examination in whom abdominal pain was the chief symptom on admission to the hospital. In more than half acute or subacute urinary infection was suspected or was discovered after an early examination. Yet in 14 the original diagnosis was appendicitis, nearly always "chronic," and in 13 others appendectomy had previously been performed but the pain persisted and the child was again brought to the hospital. In some children the cause of the pain remained uncertain even after extensive urologic, gastroenterologic, laboratory examination and, in a few, laparotomy. For the greater part the pains were the result of gradual or rapid distention of the collecting part of the urinary tract above a point of obstruction. Pain also resulted from swelling of the kidney within its dense and relatively inelastic capsule; the renal swelling may be due to acute inflammation, trauma (including stone), obstruction or tumor or it may develop more slowly when mild ureteral obstruction exists. But all the urologic lesions which cause abdominal pain are predominantly obstructive and may be situated anywhere between the renal calix and the urethral meatus. Except in an emergency it is advisable to correct the urologic disease before exploratory laparotomy is undertaken, as the first consideration will often render the second unnecessary.

North Carolina Medical Journal, Winston-Salem

3:381-484 (Aug.) 1942

Pathologic Physiology of Certain Gastrointestinal Symptoms. P. F. Whitaker, Kinston.—p. 381.
*Typhoid Fever Due to Atypical Strain of Eberthella. G. T. Harrell, Winston-Salem, and Mary A. Poston, Durham.—p. 385.
Local Use of Sulfonamide Drugs. D. B. Koonce, Wilmington.—p. 390.
Some Military Aspects of Eye, Ear, Nose and Throat Clientele. J. B. Miller, Fort Bragg.—p. 394.

Typhoid Due to Atypical Strain of Eberthella.—During the last five years Harrell and Poston have encountered at Duke Hospital 5 cases of typhoid due to an atypical strain of Eberthella. One patient had previously been given typhoid vaccine but was not protected against the infecting strain. Although the disease was caused by an atypical strain, many clinical features of classic typhoid were present: stupor or mental dulness, bradycardia, long convalescence and complications (intestinal hemorrhage, infarction of the spleen, thrombophlebitis, pyelitis, furunculosis with abscess formation, pneumonia and recrudescence of the fever) were numerous. All the patients recovered. The organism was cultivated from the blood only and was never recovered from the stools, urine, bile or sputum. It was often difficult to demonstrate the organisms in the blood stream. Numerous cultures by various technics in 1 case were sterile, until cultures were made during the early part of a chill. As agglutinins developed for the atypical strain, the titer usually rose to a high level. The immune specificity was further indicated by the fact that transient cross agglutinins developed in only 1 case for Salmonella paratyphi or Salmonella schottmuelleri (paratyphoid A and B). These agglutinins were not due to the presence of Vi antigen. Treatment consisted of the usual supportive measures. Four of the patients lived in North Carolina and 1 in the District of Columbia.

Northwest Medicine, Seattle

41:259-296 (Aug.) 1942

Irradiation in Treatment of Malignant Tumors. G. W. Holmes, Boston.—p. 264.
Surgical Principles Involved in Management of Carcinoma of Colon. V. C. Hunt, Los Angeles.—p. 269.
Fracture Dislocations of Shoulder: Immobilization Problem Cases. R. Anderson and E. Burgess, Seattle.—p. 273.
The Prematurely Born Baby: Suggestions for Its Care. P. V. Wooley Jr. and Vera C. Imhoff, Portland, Ore.—p. 275.
Vitamins in Surgery. W. F. Howard, Pocatello, Idaho.—p. 279.
Pneumatic Hammer Disease in Unusual Location. J. H. Mills, Spokane, Wash.—p. 282.
Psychiatry in Pacific Northwest: Its Development in Our Three States. A. C. Stewart and H. A. Dickel, Tacoma, Wash.—p. 284.

Oklahoma State Medical Assn. Jour., Oklahoma City

35:323-364 (Aug.) 1942

Influenzal Meningitis: Case Report. F. J. Daugherty and C. M. Pounders, Oklahoma City.—p. 323.
Problems of Behavior in Child Guidance. H. J. Binder, Oklahoma City.—p. 324.
Safety Factors in Cesarean Section. L. C. Northrup, Tulsa.—p. 328.
Complications of Duodenal Ulcer: Their Surgical Management. R. L. Sanders, Memphis, Tenn.—p. 330.
Scarlet Fever Immunization: II. Dick's Injection Method. H. C. Graham, Tulsa.—p. 335.

Public Health Reports, Washington, D. C.

57:1155-1194 (Aug. 7) 1942

Domestic Water and Dental Caries: V. Additional Studies of Relation of Fluoride Domestic Waters to Dental Caries Experience in 4,425 White Children, Aged Twelve to Fourteen Years, of Thirteen Cities in Four States. H. T. Dean, F. A. Arnold Jr. and E. Elvove.—p. 1155.

57:1195-1234 (Aug. 14) 1942

Distribution of Health Services in Structure of State Government: VI. Medical and Dental Care by State Agencies. J. W. Mountin and Evelyn Flook.—p. 1195.
Reconnaissance of Anopheline Larval Habitats and Characteristic Desmids of Okefenokee Swamp, Ga. W. C. Frohne.—p. 1209.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Children's Diseases, London

39:33-64 (April-June) 1942

Some Effects of War Conditions on 1940-1941 Measles Epidemic. R. Swyer.—p. 33.

British Journal of Radiology, London

15:213-242 (Aug.) 1942

Skeleton at Birth. J. F. Brailsford.—p. 213.
Geiger-Müller Counters. J. D. Craggs and J. F. Smee.—p. 228.
Control and Treatment of Radiation Reactions. D. W. Smithers.—p. 233.
Radiation Reactions. B. W. Windeyer.—p. 236.
Head Injury Investigated by Encephalography: Report on Series of Cases. H. Davies.—p. 238.

British Journal of Urology, London

14:63-112 (June) 1942

Observations on Blood Supply of Human Ureter. W. F. Harper.—p. 63.
Tidal Drainage of Bladder: Note. C. Wells.—p. 73.
Notes on Topography of Horseshoe Kidney. T. Zondek.—p. 79.
Note on Estimation of Surgical Risk in Prostatectomy. D. A. Abernethy.—p. 86.

British Medical Journal, London

2:61-88 (July 18) 1942

Diagnosis and Treatment of Malaria in England. W. Yorke.—p. 61.
*Factors Influencing Increased Incidence of Pulmonary Tuberculosis in Glasgow. S. Laidlaw and D. Macfarlane.—p. 63.
*Action of Pholedrine and Neosynephrin in Raising Blood Pressure. P. C. Elmes and A. A. Jefferson.—p. 65.
Depression-Hyposexual-Alopecia Syndrome. C. Allen and C. Carlyle-Gall.—p. 67.
Incidence of Breast Feeding in Small Mining Town. Enid L. Hughes.—p. 69.

Increase of Pulmonary Tuberculosis in Glasgow.—A study in 1941 of the increased incidence of tuberculosis in Glasgow revealed that it mainly involved males from 15 to 45 and females from 15 to 35. The rise was attributed to war conditions, such as long hours, overwork, strain and curtailed rest. Laidlaw and Macfarlane's present study compares the returns for 1941 with those of 1940 and 1938-1939. It considers the data of a detailed investigation into the occupations and working hours of the first 1,600 confirmed cases of pulmonary tuberculosis notified during 1941. The number of notified cases among the young adults remains high, but the rate of increase during 1941 has slowed considerably. On the other hand there has been revealed a very real increase in both sexes of less than 15 and in males of more than 45. The increase in the young group is partly accounted for by an increased proportion of home contacts. The contention that overwork and long hours are playing a major part in the increase since the war is supported by the fact that little increase has occurred among the commercial and professional classes, whose hours of work alone remain within reasonable limits. Whereas less than 20 per cent of the commercial class exceed the recommended maximal hours of work, 67 per cent of the workers in heavy industries and 40 per cent in the medium heavy industries are working in excess of these standards. In the domestic class inquiry shows that nearly 40 per cent of housewives notified during 1941 were engaged in part time war work in addition to their household duties.

Pholedrine and Neosynephrin in Raising Blood Pressure.—Elmes and Jefferson compared the effect of four sympathomimetic compounds, under standard conditions, in animals with a depressed blood pressure. The compounds were ephedrine hydrochloride, pholedrine sulfate, neosynephrin hydrochloride and phedracin hydrochloride. Ephedrine and pholedrine caused the most prolonged rise in blood pressure; the response to the first dose of each substance lasted for about forty-five minutes. The response to phedracin lasted for twenty-five minutes and the effect of neosynephrin for fifteen minutes. The duration of the blood pressure response to subsequent doses of ephedrine were rapidly and progressively diminished. The response to pholedrine over the first four injections showed little change, and the response to neosynephrin remained constant throughout. Ephedrine and pholedrine act predominantly on the heart, whereas phedracin acts on the blood vessels and neosynephrin on both the heart and the vessels. Ephedrine and pholedrine cause an increase in heart rate; neosynephrin does not. A regular vasoconstriction is produced by neosynephrin and phedracin. An effect was not always to be seen with ephedrine and pholedrine. These results are of use in determining the possibility of substituting these substances for epinephrine in local anesthesia. Ephedrine, pholedrine or phedracin were not of value, but anesthesia could be prolonged with neosynephrin to within 25 per cent of the duration resulting with epinephrine.

Journal of Mental Science, London

88:387-484 (July) 1942

Year's Experience of Intravenous Insulin in Hypoglycemic Shock Treatment of Schizophrenia. R. A. Sandison and J. S. McGregor.—p. 387.
Sodium Chloride Crystallization Test and Its Relation to Blood-Cerebrospinal Fluid Barrier. R. Ström-Olsen and E. de C. Kite.—p. 407.
Hands of Mongolian Imbeciles in Relation to Their Three Personality Groups. Charlotte Wolff and H. R. Rollin.—p. 415.
Observations in Hypoglycemia: IV. Body Temperature and Coma. W. Mayer-Gross and F. Berliner.—p. 419.
Serum Choline Esterase and Anxiety. D. Richter and Margaret Lee.—p. 428.
Serum Choline Esterase and Depression. D. Richter and Margaret Lee.—p. 435.
Hysterical Stupor Recovering After Cardiazol Treatment: Case. W. L. Neustatter.—p. 440.
Invalidism from the Army Due to Mental Disabilities: Etiologic Significance of Military Conditions. R. F. Tredgold.—p. 444.
Hamlet's "Madness." T. M. Davie.—p. 449.

Lancet, London

2:59-86 (July 18) 1942

Epidemiology of Juvenile Rheumatism. J. N. Morris and R. M. Titmuss.—p. 59.
Temporary Lens Changes in Diabetic Coma and Other Dehydrations. R. D. Lawrence, W. Oakley and I. C. Barne.—p. 63.
*Middle Meningeal Hemorrhage in Children. J. P. Lanigan.—p. 65.
Influence of Thyrotoxicosis on Menstruation. P. M. G. Russell and Edna M. Dean.—p. 66.
*Sulfanilamide in Treatment of Smallpox: Review of 103 Cases. P. B. Wilkinson.—p. 67.
Quality of National Loaf. G. N. Jenkins, E. I. McDougall and P. Herbert.—p. 69.

Middle Meningeal Hemorrhage in Children.—Lanigan reports 3 cases of bleeding from the middle meningeal artery without initial concussion and with a long latent period before symptoms ensued. In each the injury was apparently trivial, associated with momentary dazedness but no amnesia. The cases demonstrate the necessity of closely watching any child whose head has been injured. In 2 irritability and vomiting occurred six and two hours respectively after the accident. One was struck by a ball and 1 fell from a moving bus. These symptoms and dilatation of the pupil should be regarded as an "alert." These phenomena may indicate the onset of compression of the brain in cases in which there has been no concussion. After definite concussion these symptoms usually indicate a step toward recovery.

Sulfanilamide for Smallpox.—Wilkinson observed that the toxic phase in 103 patients with smallpox was not influenced by sulfanilamide, 6 Gm. in twenty-four hours, but that the focal phase was modified in some unvaccinated patients. The normal evolution of the lesions appeared arrested at the vesiculopustular stage and the secondary or focal fever was decreased or suppressed. The septic complications which occur so frequently in the focal phase were profoundly influenced by the drug; that is, the fatality rate among these patients was reduced.

Tubercle, London

23:83-106 (April) 1942

Rehabilitation and Care of the Tuberculous: Fifth Report of Employment Committee of Joint Tuberculosis Council. P. Edwards, G. Jessel, D. P. Sutherland, F. R. G. Heaf and J. B. McDougall.—p. 83.
Some Thoughts on Outdoor Employment of Sanatorium Patients. W. E. Snell.—p. 101.

Medicina, Mexico, D. F.

22:283-306 (July 10) 1942. **Partial Index**

*Medullary Transfusion in Blood Diseases. L. Sánchez Yllades and H. del Castillo.—p. 283.
Roentgen Therapy in Dermatologic Diseases. R. Gómez Farias.—p. 289.
*New Method for Diagnosis of Valvular Insufficiency of Veins of Legs. M. López Esnaurrizar.—p. 300.

Bone Marrow Transfusion in Blood Diseases.—Sánchez Yllades and del Castillo used in 15 cases the bone marrow of normal donors, which was obtained by aspiration, and injected it into the sternum of the patients. The injections were administered daily in a dose varying from 2 to 6 cc. for each injection up to a total number which varied between one and four injections. The therapy failed in agranulocytosis, panmyelophthisis, subacute lymphoblastic leukemia and pernicious anemia of pregnancy. The results were good in hemohistioblastic purpura (after splenectomy), endotheliosic purpura, anemia following roentgen irradiations in chronic myeloid leukemia, pernicious anemia, macrocytic anemia and sprue.

Diagnosis of Valvular Insufficiency of Veins of Legs.—López Esnaurrizar made the observation that the oscillometric index in the legs of patients with large varicose veins and varicose ulcers and insufficient circulation is very much increased. He had noted that the oscillations are extensive when the patient is standing, moderate when he is lying down in any posture and smallest in the dorsorecumbent position with the limb in flexion at a straight angle. The oscillations diminish or disappear when the limb is loosely constricted but reappear when constriction is removed, with the same amplitude as that which was present before the limb was constricted. The oscillations are not synchronous with the arterial diastole; they are presystolic or arterial systolic. The author concludes that venous blood causes pulsation of varicose veins when the valves of the femoral vein are insufficient. An extensive oscillometric index in the legs of patients with diminished circulation in the lower extremities is of value in the diagnosis of valvular insufficiency of the femoral vein in cases of superficial varicose veins and also in the diagnosis of occult varicose veins with valvular insufficiency of veins.

Revista Médica de Chile, Santiago

70:399-476 (June) 1942. **Partial Index**

Acute Glomerular Nephritis Without Urinary Syndrome. H. Alessandri and W. Roeschmann.—p. 408.
*Mortality in Antisyphilitic Arsenotherapy. P. Chaná C.—p. 410.
Frequency and Symptomatologic Value of U Wave of Electrocardiogram. L. Hervé and M. Besoain.—p. 415.
Diaphysectomy of Tibia and Transplantation of Fibula for Traumatic Osteomyelitis. R. Urzúa.—p. 421.
Comparative Study of Different Suture Mediums Used in Surgical Practice. G. Fuenzalida Bade.—p. 428.

Mortality in Antisyphilitic Arsenotherapy.—Chaná C. first reports 12 fatalities from routine arsenotherapy in syphilis. Arsenical dermatitis was the most frequent cause of death, being responsible for 6 of the fatalities. The majority of these patients presented acute pyogenic and gangrenous processes. Yellow atrophy of the liver was responsible for only 2 deaths. Apparently, in Chile this condition does not play the important part ascribed to it by American authors. Most types of jaundice caused by neoarsphenamine have a favorable prognosis in Chile. This may be due to the drug employed and to the lower fat content in the diet of the Chilean population. Jaundice is more frequent with the use of neoarsphenamine than with arsphenamine. Among the blood dyscrasias agranulocytosis is the most frequent. Etcheverry observed 27 cases, of which 5 were fatal. The cause of death was sepsis, general complications or hemorrhages. The same author also observed 9 cases of aplastic anemia, of which 5 were fatal. Of Chaná's 12 fatalities 2 were due to blood dyscrasias. Two other deaths were due to hemorrhagic encephalitis. As is indicated by observations in the United States, cerebral symptoms are rare in arsenotherapy of syphilis. Shock or acute renal syndrome were not observed in author's cases. The so-called massive treatment has been used in Chile since 1938. Some employ the continuous infusion of neoarsphenamine or arsenoxide and others employ multiple daily injections. After directing attention to the high incidence of syphilis in Chile, the author says that the massive treatment has so far been employed in 1,300 cases, of which 14 were fatal. Hemorrhagic encephalopathy was the cause of all the 14 fatalities except 2; that is, its incidence was 1 in 108 cases. Considering the fact that in the course of ordinary arsenotherapy the incidence of this disorder is only 1 in 27,400 (according to American statistics), massive therapy has increased the incidence of fatal hemorrhagic encephalopathy 253 times. These figures consider only the fatal accidents, but there are also grave complications which are not necessarily fatal; the author observed in one month two serious cerebral complications which were not fatal. In addition there are the polyneuritic phenomena, which, although not fatal, often have an extremely slow recovery; they are comparatively frequent with the use of neoarsphenamine. The other 2 fatal accidents were due to necrotizing nephrosis a direct result of massive arsenotherapy. Choice of preparation is important in massive arsenotherapy. Arsenoxide is tolerated much better than neoarsphenamine. There were only 8 deaths among 936 patients treated with arsenoxide and 6 among 357 treated with neoarsphenamine. The massive form of treatment is advisable for the contagious cases which are resistant to the routine form of treatment.

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254:407-554 (April 15) 1941. **Partial Index**

Clinicotherapeutic Experiences in Echinococcosis of Spleen. A. Nanna and E. Adam.—p. 422.
Partial Inversion of Duodenum. G. Töndury.—p. 442.
*Clinical and Experimental Investigations on Regeneration Capacity in Epiphysial Zone of Long Tubular Bones. F. Becker.—p. 488.

Regenerative Capacity of Epiphysis of Long Bones.—Becker applies the term epiphysial cicatrix to the epiphysial suture or synchondrosis disk. Clinical observations disclosed that fractures in the region of the epiphysial cicatrix have a particularly favorable regenerative capacity. Pseudarthrosis is practically unknown in this region; it does not occur even after faulty treatment. The period of consolidation is extraordinarily short. Especially instructive are some types of fractures of the head of the radius: when the zone of the epiphysial cicatrix is preserved intensive regeneration takes place, but if it has been eliminated the regeneration is faulty. Fragments which contain parts of the epiphysial cicatrix remain viable and may grow. Experiences in resection of the knee joint corroborate the good regenerative capacity of the epiphysial cicatrix; the preservation of this zone, particularly of its peripheral portions, seems to accelerate bone consolidation. The most convincing proof that the epiphysial cicatrix is highly important in bone regeneration is furnished by observations in the post-traumatic collateral bone transformation. Roentgenologic studies on numerous unselected fractures disclosed in the zone of the epiphysial cicatrix a sharply defined area of lesser density. The assumption of a zone of great regenerative potency seems the most probable explanation. The fact that malignant growths prefer the region of the epiphysial cleft or cicatrix is another factor which speaks for the great regenerative capacity of this zone. Experimental investigations corroborate the clinical observations. Osseous articular portions regenerate in an anatomically ideal manner when the zone of the epiphysial cicatrix is preserved, but slowly with deformity and incompletely when this zone is eliminated. When fragments of bone are transplanted into the adjoining musculature they usually remain viable if they contain parts of the epiphysial cicatrix, but they become necrotic or are absorbed when they are taken from the diaphysis. Clinical and experimental observations leave no doubt that the epiphysial cicatrix possesses a great regenerative capacity, which is latent under physiologic conditions but which becomes manifest under pathologic stimulation, as in fracture, collateral transformation, tumor development and the like. The question arises whether the epiphysial cicatrix has the importance of a superimposed center of bone regeneration in the pertaining bone, whether it is a "field or organization" in Spemann's meaning of that term. Clinical and experimental factors, although they do not definitely prove the existence of such a field of organization in the zone of the epiphysial cleft or cicatrix, indicate this strongly.

Book Notices

Handbook on Amputations. Publication authorized by the Council on Physical Therapy. Reprinted from The Journal of the American Medical Association. Fabrikoid. Price, 75 cents. Pp. 82, with illustrations. Chicago: American Medical Association, 1942.

This book is a fruit of the joint efforts of the Council on Physical Therapy of the American Medical Association and a committee from the Association of Limb Manufacturers of America to synthesize the points of view of surgeons, physical therapeutists and limb makers for the benefit of the patient. Its eleven chapters originally appeared serially in THE JOURNAL and are here brought together. The chapters deal with psychologic and physiologic principles in amputations; general principles governing all amputations; sites of election for amputation; amputations in diabetes and peripheral vascular disease; amputation in congenital and chronic disabilities; physical therapy in amputations; interrelationships of the artificial limb manufacturer, the surgeon and the patient; the manufacture of artificial limbs and rehabilitation. These subjects are developed and discussed in a brief and practical but authoritative manner. The illustrations are line drawings that picture well the points they are intended to illustrate. The work is authoritative to a high degree as it represents the combined efforts of leaders in the surgical, physical therapeutic and manufacturing fields pooling their knowledge for the benefit of the patient. It is unique in that the points of view of all concerned are brought together in a unified whole and demonstrates again the value of organized medicine acting as the coordinator of diverse specialties to teach and to standardize methods and procedures. Amputations of the extremities are common and are too often performed without thought of future function in terms of artificial limbs. Now that war has brought new causes for which amputations may be necessary this small book assumes new interest and proportions. It can be read with profit by those performing such operations and by those working for restoration of lost function. To every surgeon in civil or military life who may be called on to amputate, the reading of the monograph should be obligatory, as it simplifies and illuminates surgical operations that once were its chief ornaments but which have become commonly an uninspired performance as the result of lack of interest fostered by infrequent demands. A renewed opportunity afforded by the war for wider experience should be met by knowledge derived from this small but authoritative manual.

Cineplastic Operations on Stumps of the Upper Extremity. By Rudolph Nissen, M.D., and Ernst Bergmann, M.D. Cloth. Price, $3.75. Pp. 88, with 96 illustrations. New York: Grune & Stratton, 1942.

This volume is of special interest and importance at this time because of the war. The basis of the authors' experience rests on the material of the Sauerbruch Clinic in Vienna, where the authors formerly worked. They have made certain modifications of the technic and present only those procedures which have stood the test of time.

The book contains the history of cinetization of an amputation stump, which means the practical utilization of the potential power remaining in the muscles of the stump. The purpose of the operation is to utilize the residual muscle power to motivate an artificial limb and to reproduce as nearly as possible the efficiency of a normal limb. The opening or closing of the artificial hand is accomplished by flexion and extension of the elbow. The authors give credit to Vanghetti for originating the method. He was not a surgeon, but he taught his fellow countryman Ceci the technic. Ceci used the method on wounded soldiers from the Abyssinian campaign of 1897. Sauerbruch took up the work where Ceci left off and established the technic as it is now practiced. Numerous authorities have contributed to the development and improvement of the technic. Krukenberg devised a definite technic of plastic reconstruction of the stump of the lower arm. The cinetization was introduced throughout the world, in the United States especially, by H. H. Kessler.

The authors limit themselves to the operative technic of the Sauerbruch muscle-canal construction, which they consider to be the method of choice. They discuss the physiologic and anatomic aspects of the subject, going deeply into the question of voluntary muscular movement and all its components. One of the most important of their deductions is that muscles running diagonally to the long muscles of the body should not be employed to furnish power.

The book contains some beautiful and instructive illustrations on the muscles of the upper extremity with indications as to the optimal locations for making the canals. There are many instructive cross sections, some in color. The choice locations for operation and the optimal dimensions are given. If the biceps muscle is not available the brachialis may be substituted. The selection of cases is clearly designated. Cases of double amputation are the most promising subjects for cineplastics. The potential strength of a canalized muscle is surprisingly great. It is equally surprising to note that the sense of touch can be acquired to a remarkable degree. The proportion of the stump neuromas, stump ulcer and atrophy of stump muscles are discussed. The patient is taught routine phantom movements. The operative technic is given in detail. The three most important points are that (1) the canal should be short and wide and constructed at right angles to the direction of the muscle fibers, (2) the canal should pierce the muscles at a level which will leave two thirds of the thickness of the available muscle mass between it and the bone and (3) the internal suture line of the skin tube should be placed proximally so that it will not be subject to any tension or compression during contraction.

The authors enumerate specific instructions that are given patients before anesthesia. The technic of the skin flaps and the position of the intracutaneous sutures of the skin tube are described.

There are some beautiful colored pictures of the technic of canalization showing every step in the process. The authors illustrate their results by showing patients lifting a pail of water and pouring its contents into another pail, patients striking a match and lighting a cigaret, opening and closing their hand, writing on a blackboard with chalk and removing a handkerchief from their pockets. A full page letter written by a patient with an artificial limb is reproduced.

The mechanism and construction of the artificial limb is presented in full. The technic of the plastic operation is well described and illustrated. The Krukenberg operation is given in detail. This operation is a method of plastic revision of the muscles of a forearm stump consisting of a grasping apparatus on the style of a forceps. The ulna and radius are the respective limbs. This operation has the advantage of grasping terminals with voluntary movement, which gives them the additional advantage of tactile sensation, thus obviating the need of an artificial limb. If desired, a prosthesis can be added to supply function of the fist and fingers. The technic is presented and well illustrated. Naturally the mechanical accomplishments of a person with a Krukenberg stump are less varied than the person with a Vanghetti stump and prosthesis.

The book is easy to read and to understand by those who have had experience in this highly specialized type of work.

Serology in Syphilis Control: Principles of Sensitivity and Specificity. With an Appendix for Health Officers and Industrial Physicians. By Reuben L. Kahn, M.S., D.Sc., Director of Clinical Laboratories and of Serologic Consultation Service, University of Michigan Hospital, Ann Arbor. Cloth. Price, $3. Pp. 206. Baltimore: Williams & Wilkins Company, 1942.

This book is not intended to be a guide book on the technic of making serologic tests for syphilis. As stated in the preface, it is an amplification of six lectures delivered at the U. S. Navy and U. S. Army medical schools at Washington, D. C., in the spring of 1939, and of classroom lectures given at the University of Michigan to physicians taking courses in venereal disease control. The book deals with the principles of serology and gives a broad survey of the development of complement fixation and precipitation tests. It is a faithfully written history of the role of the laboratory in the diagnosis and treatment and control of syphilitic disease.

There are two questions which confront a physician when he receives a report from a laboratory on a test for syphilis: What is the "sensitivity" and what is the "specificity" of the

test or tests utilized by this particular laboratory? In other words, does the test when positive indicate that the patient has syphilis? When negative, does it indicate that he is free of syphilis? In the case under treatment, does the onset of a negative reaction mean a proof of cure? These are the practical points that interest the clinician. Kahn has attempted to answer these questions in a truly scientific manner by a discussion of the mechanics of the tests, complement fixation or precipitation; by statistical analyses, by a review of the factors which are basically the foundation stones of this serologic structure. Sensitivity and specificity, definitions; whether or not to aim at hundred per cent sensitivity in syphilis; the efforts to increase sensitivity in both complement fixation and precipitation tests; the place of the supersensitive test, the attempt to arrive at an equalization of various tests by the so-called multiple test system; the rationale of quantitative serologic reactions; finally, chapters on the serology of syphilis control by the health officer and by the industrial physician: these are the various chapter headings.

This is a new type of book on serology—a serious and unbiased attempt to aid in interpretation of laboratory facts or reports—reports which have often left a physician confused rather than enlightened by reference of his problem to the laboratory. It should be a definite means of helping to clear up the smoke screen left by one or multiple laboratory reports. It is written by a serologist whose name is well known as the author of the most popular and commonly used precipitation test.

Acute Injuries of the Head: Their Diagnosis, Treatment, Complications and Sequels. By G. F. Rowbotham, B.S., F.R.C.S., Neurological Surgeon, Royal Victoria Infirmary, Newcastle-on-Tyne. With a foreword by Norman M. Dott, M.B., Ch.B., F.R.C.S., Neurological Surgeon, Royal Infirmary, Edinburgh. Cloth. Price, $7.50. Pp. 288, with 124 illustrations. Baltimore: William Wood & Company, 1942.

This is one of the best books on the subject thus far written. The wide experience of this author, both in civil and in military life, enables him to speak authoritatively concerning the management of the acute brain injury.

He stresses the role played by the automobile as the causative factor of acute head injuries. Apparently the experience in England is comparable to our own. The numerous air raids and bombings which the English have undergone enable the author to present excellent descriptions concerning the mechanisms of closed, compound and penetrating brain injuries.

Dr. Rowbotham stresses the importance of close observation and repeated neurologic examinations, the evaluation of each sign and symptom and the approximate diagnosis of the brain lesion as necessary guides to treatment. In addition to the neurologic findings he interprets the significance of pulse and respiratory rates, and especially blood pressure findings.

He has classified his cases into three groups according to the state of disturbed consciousness and the depth of the unconsciousness. His explanations and interpretations of these various phenomena indicate a highly trained neurologic background.

Under treatment the author gives the greatest emphasis to spinal drainage and operative procedures. He feels that knowledge concerning the presence of subarachnoidal bleeding and the spinal fluid pressure, as gaged by the manometer, are two of the most important guides concerning subsequent management. Therefore, in the unconscious patient he recommends a spinal puncture after twelve hours, with removal of spinal fluid until the manometer reading has reached 50 mm. If the pressure is high he advocates repeating the spinal puncture as often as every four hours, thus striving to keep the spinal fluid balance as near normal as possible. One has the impression that this author is one of the strongest advocates of spinal drainage in the management of acute brain injuries. He points out the radical attitude of certain authors concerning dehydration management and the opposition of other authors to any form of dehydration. He then states that he uses hypertonic, 50 per cent, sucrose solution and magnesium sulfate enemas for dehydrating purposes but to a point midway between that advocated by Temple Fay and the nihilist attitude of Jefferson. He feels that in cerebral edema dehydration assumes its greatest role but prefers to depend on spinal drainage when blood is present in the spinal fluid.

Rowbotham devotes a considerable portion of his book to operative treatment of acute head injuries. One gains the impression that he turns to subtemporal decompression per se or exploratory decompressions more frequently than do the majority of surgeons in this country. This is due probably to the nature of the war injuries he is now treating. We do not believe that in civil life such a high incidence of operation is necessary. His description of various operative measures for the correction of large bony defects in the skull following these injuries is definitely instructive and valuable. The book is well illustrated, especially in the chapters on pathology and operative technic.

Ambassadors in White: The Story of American Tropical Medicine. By Charles Morrow Wilson. Cloth. Price, $3.50. Pp. 372, with 42 illustrations. New York: Henry Holt & Company, 1942.

The subtitle of this book—The Story of American Tropical Medicine—is more correctly descriptive than the main title. The merits of this subject for popular consumption in fact have been greatly neglected. Now the whole field of tropical medicine is vitally important to the northern as well as to the southern American continent. The author, who perhaps may be best described as a roving reporter, writes this for the nonmedical public, but it contains much information which would surely be news to most physicians. In the preparation of this book the author has gone to unusual lengths in investigating his facts; it is exceptionally well documented, but the documentation is arranged so as not to interfere with the ease of reading. The author has given proper recognition in the story of yellow fever to the long neglected Carlos Finlay of Cuba. Chapters each are also given to the better known Walter Reed and Gorgas of Panama Canal fame. Dr. William E. Deeks of Canada and his part in Central American medical history again is less well recognized, but he also is given a chapter. The work of many other physicians and public health officials is discussed without, however, making the book read too much like a catalogue. Incidentally, in connection with the recent publicity over jaundice following the use of yellow fever vaccine, chapter 13 of this book mentions the fact that millions of doses of yellow fever vaccine have been supplied by the laboratories of this country. There are a few minor defects in style, especially in the first two chapters: the word "ironically," for example, is overworked. There are four appendixes, the first being devoted to acknowledgments, the second is a general bibliography, the third a chronological list of Latin American epidemics and the fourth a list of populations in Latin American countries. The book can be recommended for either professional or nonmedical readers.

A Short History of Nautical Medicine. By Louis H. Roddis, M.D., Captain, Medical Corps, United States Navy, Washington, D. C. [Reprinted from Annals of Medical History (Third Series Vol. III, Nos. 3, 4 and 5, 1941.)] Cloth. Pp. 359, with 13 illustrations. New York & London: Paul B. Hoeber, Inc., 1941.

This book includes two parts: a general history of maritime medicine in which some of the story of the United States Navy has been included and a series of biographies of the surgeon generals of the United States Navy. It is only the first part that is included in the present work. Chapters are provided on early nautical medicine, disease and disaster in the old sailing ships, the medical departments of naval vessels, the rise of naval hygiene, naval medicine in the United States Navy, hospitals for seamen and hospital ships, nautical medicine and the mechant marine, the uniforms and insignia of medical men afloat, and research in nautical medicine. The material has presumably appeared in large part in the *Annals of Medical History* and has been picked from that publication for inclusion in this book. It is therefore in an easily readable column, well illustrated, with large type, and will be found a most enjoyable volume by any one who is at all interested in medical services in the Navy. The author writes with little embroidery but with a succinct factual style. His essay on research in nautical medicine presents a list of some forty subjects demanding more elucidation than is now available and indicating trends in research which should be exceedingly useful for those who are trying to make progress. The book concludes with a chronological table of accomplishments in naval medical history.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

MOSQUITO "BITES"

To the Editor:—**What is the nature of the substance instilled in one during a "bite" by a mosquito which is responsible for the itching and inflammatory reaction? What is the exact chemical structure of the compound?**

Richard L. Fruin, M.D., Chicago.
Lieutenant, M. C., U. S. Navy.

ANSWER.—The nature of the substance inoculated by mosquitoes in the act of "biting" is a subject of considerable debate. The intensity of the reaction to the bite of these insects varies with the individual, and persons frequently exposed develop a species specific immunity. Extracts of mosquitoes (Benson, R. L.: Diagnosis and Treatment of Sensitization to Mosquitoes, *J. Allergy* **8**:47 [Nov.] 1936) and of fleas (Cherney, L. S.; Wheeler, C. M. and Reed, A. C.: Flea Antigen in Prevention of Flea Bites, *Am. J. Trop. Med.* **19**:327 [July] 1939. McIvor, Barbara C., and Cherney, L. S.: Studies in Insect Bite Desensitization, *ibid.* **21**:3 [May] 1941) have been prepared and employed with considerable success in the immunization of individuals hypersensitive to the bites of these insects.

In 1911 Bruck (*Deutsche med. Wchnschr.*, p. 1787) prepared a glycerin and chloroform extract of whole mosquitoes which he named culicin. This extract produced a reaction when inoculated into the skin similar to the bite of a mosquito. Bruck reported that the extract had hemolytic powers. Nuttall and Shipley (*J. Hyg.*, 1901-1903) prepared saline extractions of the salivary glands of Culex pipiens and found that the extract neither prevented coagulation nor caused hemolysis. Schaudinn (*Arb. a. d. k. Gsndhtsamte.* **20**: 387, 1904) found that the so-called sucking stomach (esophageal diverticulum) of the mosquito was emptied during feeding and that the contents produced a noticeable and characteristic irritating effect when introduced through an opening in the skin. Schaudinn was unable to reproduce a similar irritating effect by injecting extracts of salivary glands under the skin. He believed that the characteristic irritation of the mosquito bite was due to enzymes from commensal yeast cells present in the contents of the sucking stomach and inoculated as the mosquito sucked blood.

McKinley (E. B.: Salivary Gland Poison of Aedes aegypti, *Proc. Soc. Exper. Biol. & Med.* **26**:806 [June] 1929), working with Aedes aegypti, prepared saline extracts of the salivary glands and found that these extracts would produce the characteristic wheals in susceptible individuals. These extracts were not destroyed by freezing to —12 C. for five hours or by heating in boiling water for ten minutes and did not produce hemolysis of human red cells or prevent coagulation. McKinley (E. B.; Draper, W. F., Jr., and Baker, F. C.: Stability of Mosquito Venom in Vitro, *ibid.* **41**:168 [May] 1939) found that the extracts retained their potency after eight years' storage under refrigeration.

Although the composition of the toxic principle introduced by the mosquito while sucking blood is not known, it is believed to resemble closely bee venom, which is considered a combination of lecithin with basic radicals somewhat resembling sapotoxins and cantharidin.

STUTTERING

To the Editor:—**A boy aged 3 began to stammer following an acute respiratory illness several months ago. What is the etiology and prognosis? Should I try to prevent his stammering or ignore the condition, thinking he will outgrow it?**

M.D., Arizona.

ANSWER.—Stammering (stuttering) is a somatic manifestation of an emotional disorder based on a psychobiologic variation of the organism. As yet there is doubt as to the exact mechanism that underlies this variation, but evidence strongly suggests the presence of an inherited constitutional factor which predisposes to emotional instability and psychomotor disorganization in general and to stuttering speech in particular. However, a person's inherent psychosomatic deficiencies would not in themselves cause stuttering speech without some active precipitating factor: shock, cumulative environmental pressure, radical change of environment or, as in the instance cited, acute or prolonged illness.

There are two stages in the development of stuttering, primary and secondary. The child under discussion is apparently in the primary stage. The chances of arresting the disorder are much greater in this first stage, before anxiety and inferiority feelings begin to develop and before conditioning has had time to operate. In the primary stage, therapy is largely a matter of slowing down the tempo of living and removing any exciting stimuli in the home environment, particularly the excitement and tensions generated by neurotic parents. Family quarrels, exciting games, rapid speech or other "nervous" reaction patterns on the part of parents or older children should be eliminated. The child should be kept in as good a physical condition as possible, he should have frequent periods of rest and relaxation, and fatigue should be avoided. Also, since the stuttering child demonstrates in general a lowered degree of psychomotor efficiency, especially in those functions requiring fine coordination, a certain amount of rhythmic work is recommended: games and simple exercises in time to music, marching to the beat of a toy drum, bouncing a ball in rhythm and the like. He should be encouraged to do everything, speaking included, slowly and easily. Games in which the whole family participates can be devised to inculcate the idea of slow, easy, rhythmic activity.

With regard to the stuttering symptom itself, the parents should avoid correcting the child's speech directly, since this may make him speech conscious and precipitate the second stage of the disorder. A tactful suggestion—"Let's all try to talk slowly and easily; I don't hear so well today"—will usually produce better results than making a child repeat a specific word or phrase with which he has had difficulty. The parents should also avoid the all too common habit of interrupting the child when he stutters, talking for him when he is having difficulty or suggesting some "tool"—taking a deep breath, for instance—to help him over the blockage. Such tactics serve only to arouse his awareness of his difficulty and to develop anxiety and feelings of inadequacy. If possible, the child should not be allowed to suspect that the physician or parent is concerned about his speech or that it is in any way abnormal. One should concentrate, rather, on his assets and strive to develop a confident, secure personality. This, together with the elimination of tension and excitement in the home environment and the general slowing down of the child's reaction patterns, will in most cases arrest the development of the disorder before it reaches the secondary stage. The important point to remember is that in the early stage of stuttering therapy should always be indirect and should enlist the cooperation of the entire family.

MORPHINE IN TREATMENT OF BURNS

To the Editor:—**Some confusion seems to exist regarding the use of morphine in the treatment of severe burns. Becker and Obermayer's "Dermatology," page 248, states that "the administration of morphine in severe burns is a mistake. For pharmacologically yet unexplained reasons morphine has a deleterious effect and considerably increases the mortality of severe burns as proved by statistics." The literature on the treatment of burns from the Medical Division of the U. S. Civilian Defense advocates morphine in large and repeated doses. Which is correct?**

Harold O. Closson, M.D., Ashland, Kan.

ANSWER.—The use of morphine in severe burns is still a controversial question. The statement in Becker and Obermayer's book that "the administration of morphine is a mistake" does not, however, represent the majority opinion in this country at the present time. Weidenfeld (*Arch. f. Dermat. u. Syph.* **61**:33, 301, 1902), himself a dermatologist, opposed its use as do several other German writers on the subject, including Hilgenfeldt (*Ergebn. d. Chir. u. Orthop.* **29**:102, 1936).

The modern treatment of burns requires débridement and cleansing, and for this purpose some sort of analgesia is essential. It is to be granted that any analgesic increases the danger, but probably no more so than for any other operation on a sick patient. In the United States morphine is considered preferable to general anesthesia in early burn treatment and, to be effective, must be given in adequate doses. Careful observation of the patient during the first hour after the administration of morphine is essential, and signs of anoxia or slowing of the respiratory rate should be a signal for prompt administration of oxygen. The recent recommendations of the United States Navy (*Bull. Am. Coll. Surg.* **27**:111 [April] 1942) and of the National Research Council (*War Med.* **1**:334 [March] 1942) advise an initial dosage of ½ grain (0.032 Gm.) of morphine for the average sized adult. Quarter grain (0.016 Gm.) repeat doses may be ordered as indicated.

The literature concerning the pros and cons of morphine administration in the treatment of burns is listed in extenso by Henry N. Harkins (The Treatment of Burns, Springfield, Ill., Charles C Thomas, 1942).

TREATMENT OF EXCESSIVE HAIR ON LEGS

To the Editor:—Many women are going without hose at the present time and are therefore concerned more than ever before with the growth of hair on the legs. Please advise whether it is better to shave or to use a depilatory or bleaching compound. Kindly give details of the procedure recommended, including the formula or name of the preparation to be used.

Needham B. Bateman, M.D., Atlanta, Ga.

ANSWER.—Whether to shave the legs with a razor or to use a depilatory is a question of personal preference. Neither is harmful if done correctly. A simple formula for a depilatory:

	Gm. or Cc.
Fresh barium sulfide	8.0
Zinc oxide	
Starch .....āā	12.0

Mix and label "Moisten with water to make a paste." Apply this to the hairy surface and allow it to remain for about ten minutes. If there is a burning sensation before the ten minutes has elapsed, remove it sooner. Scrape off the paste and the hair with a smooth wooden blade and wash off the remaining paste.

An easier method is to buy one of the prepared depilatories and follow the directions adapted to that particular preparation.

According to Hair-Dyes and Hair-Dyeing Chemistry and Technique, by H. Stanley Redgrove and J. Bari-Woollss (London, William Heinemann, 1939, p. 134) hair may be bleached by washing, and drying the hair, then applying with absorbent cotton or a brush a mixture of 20 volume hydrogen peroxide and one twentieth of the amount of ammonia water 0.880. This corresponds closely with the stronger ammonia water of the U. S. P. The authors warn against using too much ammonia, suggesting 1 to 30 in certain instances. The bleaching should take place in a few minutes. To bleach a whole head of hair takes from ten to forty minutes, and the short sparse hair on the legs should be decolorized much more quickly. Dry the legs by pressure with a towel. Ordinary 3 per cent peroxide will not do the work.

RAGWEED HAY FEVER

To the Editor:—I am suffering from hay fever caused by ragweed. This was established in 1940 by a cutaneous test. Last year while I was using an extract prepared by an allergist, containing common and giant ragweed 20,000 pollen units per cubic centimeter, my nasal symptoms were negligible. (Preseasonal treatment was started in May.) This year I used Lederle's ragweed combined antigen in approximately the same dosage as last year, but the symptoms at the onset of the season were much worse than last year, and I could neither taste nor smell for about 2 weeks. The 1942 desensitization period was started in the middle of April and finished at the beginning of August, with the planned maximal dose of 20,000 units. Severe nasal symptoms started around the middle of August. I continued to take 20,000 units of Lederle's ragweed combined antigen in one injection once weekly. The ragweed pollen count in St. Louis (air distance from here approximately 87 miles) varied between 100 and 550 in twenty-four hours. At the beginning of September the dosage was split to 10,000 units twice weekly, followed by considerable improvement of the nasal symptoms. There is now a moderate local reaction lasting for about 24 hours and, it seems, some increased nasal irritation following the injection. The ragweed count in St. Louis during this month was mostly below 100. 1. Would it be advisable for me to take only 10,000 units once weekly during this season? 2. Is there any theory concerning the action of the pollen antigen in the treatment of allergic conditions which makes an adjustment of the weekly dosage during the season possible by observation of the individual patient and by the twenty-four hour pollen count? 3. How many pollen units taken preseasonally are considered sufficient to produce a relative state of "immunity" against the offending pollen? 4. Judging by my symptoms, do you think that there existed an incongruity in the standardization of the extract used in 1941 and 1942? What conclusions do you draw for the next year's treatment schedule?

M.D. Illinois

ANSWER.—The experiences suffered by the inquirer are typical of those which occurred this season throughout the ragweed belt. The total amount of ragweed pollen in most communities was probably smaller this year than in 1941, but the onset of the hay fever season was extremely severe, and most of the pollen was thrown out into the air in the last two weeks of August. Labor Day, usually about the worst day of the season, was comparatively mild this year, and after Labor Day the season remained mild.

In answer to the questions: 1. Most men doing allergic work try to have their patients reach as high a dosage as possible just before the hay fever season begins, after which the dosage is usually reduced from one fourth to one third. Most allergists continue to give this reduced amount at intervals of approximately once or twice a week during the hay fever season. After the season is over, the dosage is then gradually increased at intervals of every two weeks so that when the next hay fever season starts the patient has reached a higher dosage than he had the previous year. This method of treatment is strongly recommended. 2. While this method is correct in general, there must necessarily be some variations, depending on the individual patient. For example, one who has no symptoms at all need not have a reduction of dosage. In one who has severe hay fever symptoms, it may be wise to reduce the dosage as much as 50 per cent. 3. No one knows how many pollen units taken preseasonally are sufficient to produce a relative state of "immunity" against the offending pollen. There is a wide difference of opinion on this point. Some men are content to give a top dosage of approximately 5,000 units, and others strive to reach 60,000 or even 100,000 units before the season starts. The concensus is, however, that the patient should be pushed up, with the proper precautions, to as high a dosage as he can tolerate. Those who can reach 50,000 to 60,000 units usually have but little hay fever, and if this amount can be continued or increased over a period of years there is a fair chance of more or less permanent immunity. 4. There was probably no incongruity in the extracts used in 1941 and 1942. It is suggested that the dosage should be increased as much as possible and that the plan outlined under 1 be followed.

PLASMA FOR TRANSFUSION AND FATE OF ERYTHROCYTES

To the Editor:—I am interested in the problem presented by the technical aspects of making human plasma to be stored for emergency use. If you have any suggestions or bibliography, I would welcome such information. When plasma is being collected, the whole blood of the donor is taken. About 50 per cent of this total volume eventually becomes plasma and the cellular elements are thrown away. Is there any reason why a fairly simple technic could not be worked out to return the cellular elements (properly diluted in saline solution and the like) to the donor and thus (*a*) avoid this waste of cellular elements, (*b*) permit the donor not to suffer the loss of the cells and (*c*) permit the donor to return much sooner to make further plasma donations, since there would be no loss of cellular elements? The physiologic advantages would seem to be desirable, and certainly the psychologic aspect would be improved. People always think of "red blood" and if they knew that they were giving only the "water" in the blood, the number of contributions would step up remarkably. Any comments you care to make would be of considerable assistance.

M.D., Massachusetts.

ANSWER.—The human plasma for use by the armed forces is prepared under a joint agreement by the American Red Cross and the National Research Council. Under this agreement all technical procedures are specified and approved by the National Research Council, the National Institute of Health and the representatives of the Army and Navy. By the terms of these specifications the blood is obtained from donors in centers provided by the Red Cross. The processing of the blood into plasma must be done in biologic laboratories operated under license from the National Institute of Health. Under this arrangement the whole blood is transported, often many hundreds of miles, from the bleeding center to the processing plant. Were the red cells to be used to replace those removed, so much handling and time would be required as to render the procedure impracticable. Much thought has been given to this problem, and attempts have been made to convert the waste erythrocytes into crystalline hemoglobin which could be returned to the donor to serve as a source for new hemoglobin production. This procedure has not been found to be satisfactory. It is doubtful whether the replacement of the removed cells would permit the donor to return much sooner to make further blood donations. The trauma to erythrocytes inevitable in the repeated handling involved in the separation of plasma would in all probability render these erythrocytes more fragile than normal. Were this the case, they would tend to be destroyed in the circulation more rapidly than untraumatized cells. Adequate evidence is at hand to warrant the assumption that the breakdown products of such destroyed erythrocytes would serve as an ideal source of building stones for new hemoglobin. However, the rate of blood regeneration after a single 500 cc. blood donation is so rapid in healthy persons that its acceleration by the return of removed erythrocytes appears to be not worth the expense and hazard involved.

The fact should be recalled that, in the fiscal year July 1, 1942 to July 1, 1943, three million five hundred thousand donations will be made for the armed forces. This rate requires the utmost speed and efficiency in the operation of the donor service. To add a second procedure which would involve the introduction into the vascular system of a labile biologic product would be uneconomical and, more serious, distinctly dangerous.

TABES WITH BEGINNING OPTIC ATROPHY

To the Editor:—A man aged 65 with tabes dorsalis and moderately advanced Charcot's joint is having rapidly increasing contracture of his visual fields. The ophthalmologist states that in an Argyll Robertson pupil there is some narrowing and tortuosity of the vessels, and that the disks are more white and shiny than normal but well defined. A recent ophthalmologic examination excludes the presence of any evidence of optic atrophy but discloses the presence of bitemporal hemianopsia. The blood pressure is 190 systolic, 110 diastolic and the heart is normal except for a moderate enlargement. The tones are not clear and there is an occasional premature beat. The urine contains a slight trace of albumin and there are a few hyaline and granular casts. All blood serologic reactions for many years have been persistently negative, but spinal fluid taken in January 1942 was reported positive. Considering the man's age and general physical status, I should be disposed to refrain from all intensive therapy were it not for the fact that the constriction of his visual field is proceeding fairly rapidly. I should appreciate word as to the treatment that should be used in this case. Should dependence be put entirely on iodides or are arsenic and other heavy metals, perhaps even tryparsamide, indicated?

M.D., Illinois.

Answer.—Best results will be achieved in cases of beginning optic atrophy in connection with tabes dorsalis through the use of fever therapy. However, for a patient of this age and with a blood pressure of 190/110 (noting particularly the diastolic pressure and the fact that the urine contains a slight trace of albumin with a few hyaline and granular casts) it is questionable whether fever therapy could be used. A more conservative procedure would be potassium iodide internally in 0.5 Gm. doses three times a day. Intravenous injections of sulfarsphenamine 40 mg. for a series of ten treatments may be employed followed by intramuscular injections of iodobismitol 2 cc. twice a week for a series of ten weeks. After this the arsenical and bismuth therapy may be repeated.

Naturally it will be necessary to watch a patient like this closely, particularly the kidney and cardiac condition. The outlook is poor in a situation of this sort.

LYMPHEDEMA AFTER SPRAINED ANKLE

To the Editor:—I have seen occasional cases of sprained ankles in which the swelling was out of proportion to the pain and it persisted for years. X-ray examination in each case was negative for osseous pathologic changes. Can you offer any suggestions as to further study or treatment?

M.D., District of Columbia.

Answer.—If ligaments are overstretched until some of the fibers are actually torn and the position of the foot following this injury is not well maintained in a neutral or overcorrected position, the fibers will heal with an excess of scar tissue and with an actual elongation of the ligaments. Such ligaments are then too lax to maintain good stability. There is a tendency constantly for the ankle to wobble and for strain of weight to be thrown against the over-relaxed ligaments in walking or even in standing. Such ligaments and the tissues surrounding them become edematous. This is a lymphedema. The condition may be prevented by adequate immobilization followed by a period of exercises and heat and massage by a good physical therapist. This helps to accelerate circulation of lymph and of blood. The chronic cases do not respond well to any type of treatment. Support by an elastic stocking or bandage for several months is sometimes helpful.

PLASTIC INDURATION OF CORPORA CAVERNOSA

To the Editor:—A man aged 65 with advanced arthritis deformans and chronic valvular disease complains of rather frequent erections and that his penis bends acutely upward or dorsally and that therefore the sexual act has become impossible. He wants me to cut the dorsal ligament. He has no other symptoms of prostatic enlargement such as nocturia or frequency. His prostate is of normal size and his urine is normal.

Joseph O. Rude, M.D., Juneau, Alaska.

Answer.—The clinical description given is typical of plastic induration of the corpora cavernosa, more generally known as fibrous plaques of the corpora cavernosa and described sometimes as Peyronie's disease. This disease is characterized by fibrous nodules in the sheath of the corpora cavernosa or in the septum between these two bodies. This fibrosis encroaches on the corporal contents at times and disturbs the elasticity of the tissue affected and makes for a chordee in the direction of the lesion. This chordee may be lateral, either side, or dorsal or a combination of dorsal and lateral.

This disease has no known etiologic factor, although it has been known to be associated with gouty tendencies or chronic arthritis such as is present in this case and probably represents some factor concerned with the primary infectious disease. Surgical removals have been failures in most instances because it not only recurs but will have a superimposed surgical scar.

There have been a few reports of improvement by the use of applications of radium and more recently by high voltage roentgen therapy. The writer has seen no important benefit from any type of irradiation or medication, although possibly massage of the lesion over a sound has a tendency to prevent progress of the lesion and, at times, may reduce the symptom of local pain which sometimes occurs during an erection.

PONTOCAINE HYDROCHLORIDE AND CORONARY THROMBOSIS

To the Editor:—For fourteen years I have been using pontocaine hydrochloride solution 0.5 per cent and 2 per cent for local anesthesia in the nose and larynx. I have never seen any disadvantages. Recently I applied pontocaine hydrochloride 2 per cent to get an anesthesia of the vocal cord for the removal of a common polyp from a healthy man aged 47. After the administration of about 1 cc. of the standard solution without epinephrine or ephedrine, the patient showed the typical signs of pontocaine intoxication, such as nausea, vomiting, sweating, choreic movements, dilated pupils, cyanosis and rapid pulse. After one hour he recovered completely. For the following three days he didn't feel so well but couldn't give any specific complaints. The later course was absolutely uneventful. Fourteen days after the incident the patient was suddenly taken ill and showed all the symptoms and signs of a coronary thrombosis. Do you think that there is any relation between the pontocaine intoxication and the coronary condition?

M.D., New York.

Answer.—It is highly improbable that the pontocaine intoxication induced or even favored the occurrence of the acute coronary thrombosis in this case. In the first place the drug itself can be exonerated and in the second place the time interval, if given correctly, is too great. It is true that certain accidents which cause a severe reaction with considerable circulatory depression, as in the case of peripheral vascular shock due to pulmonary embolism, can and occasionally do result in acute myocardial infarction with or without actual coronary occlusion, almost always superimposed on a considerable degree of coronary atherosclerosis with narrowed lumen. Such heart lesions, however, develop rapidly, either during the reaction to the accident itself or within a few hours or a day or two afterward. An interval of two weeks, as in this case, strongly suggests that the acute coronary thrombosis was a coincidence and would have taken place anyway even without the pontocaine intoxication. It is, of course, barely possible that the coronary occlusion might have occurred painlessly during the day or two immediately after the administration of the anesthetic, to become manifest only fourteen days later, but the history makes this highly unlikely.

CONVEX FINGER NAILS WITH NUTRITIONAL ANEMIA

To the Editor:—During my stay in Nassau General Hospital I found a peculiar malformation of the finger and toe nails of patients suffering from a nutritional hypochromic, macrocytic anemia. The nails present a convex surface, both longitudinally and transversely, resembling the convex aspect of a spoon and just the opposite of koilonychia; they remind one of club fingers. From these they differ in that the pulps of the fingers or toes are not distended and the phalanges taper normally. This is best seen on the volar aspect. I wonder if the condition is known and mentioned in the literature.

M.D., Bahamas.

Answer.—As far as can be determined, this type of nail has not been reported to occur specifically in hypochromic macrocytic anemia (Pardo-Castello, V: Diseases of the Nails, Springfield, Ill., and Baltimore, Charles C Thomas, 1941. Cleveland White, personal communication). Such an anemia may be caused by a combination of deficiencies, including iron, plus the antipernicious anemia principle protein or vitamins. Hardwick (*Arch. Dis. Childhood* **14**:279 [Dec.] 1939) reported clubbing of the finger nails of 2 children with celiac disease. In this condition there is frequently a calcium deficiency.

The convexity of the finger nails noted is probably related to the nutritional deficiency.

LABORED RESPIRATION AND DROPPING MANDIBLE

To the Editor:—I have noticed many times in deeply comatose patients a dropping of the lower jaw which greatly impedes the already labored respiration. By simply lifting the chin one relieves the obstruction to the air passage at once. The same is true in inhalation anesthesia. Why does prolapse of the lower jaw in deep coma cause obstruction of the air passage and what is the mechanism of relief when the jaw is lifted?

M.D., Iowa.

Answer.—With passive relaxation of muscles in general under the conditions described, the jaw muscles allow the mandible to sink dorsocaudally. This in turn relaxes the supports of the pharynx and larynx attached to the mandible. The larynx tilts backward and partially closes the glottis by the pressure of the base of the tongue on the epiglottis. Lifting the mandible removes the mechanical obstruction and permits free play of the epiglottis.